

November 1958

RAILWAY

TRACK *and* STRUCTURES

A Simmons-Boardman Publication



IMPROVED HIPWASHERS

IMPROVE TRACK



24 hours a day, year in and year out, our tremendously powerful railway spring washers are on duty along thousands of miles of well-laid track.

They play an important role by equalizing bolt tensions, by protecting rail ends and joints. They absorb shocks and stresses—and they reduce maintenance costs.

(Louisville and Nashville Photo)

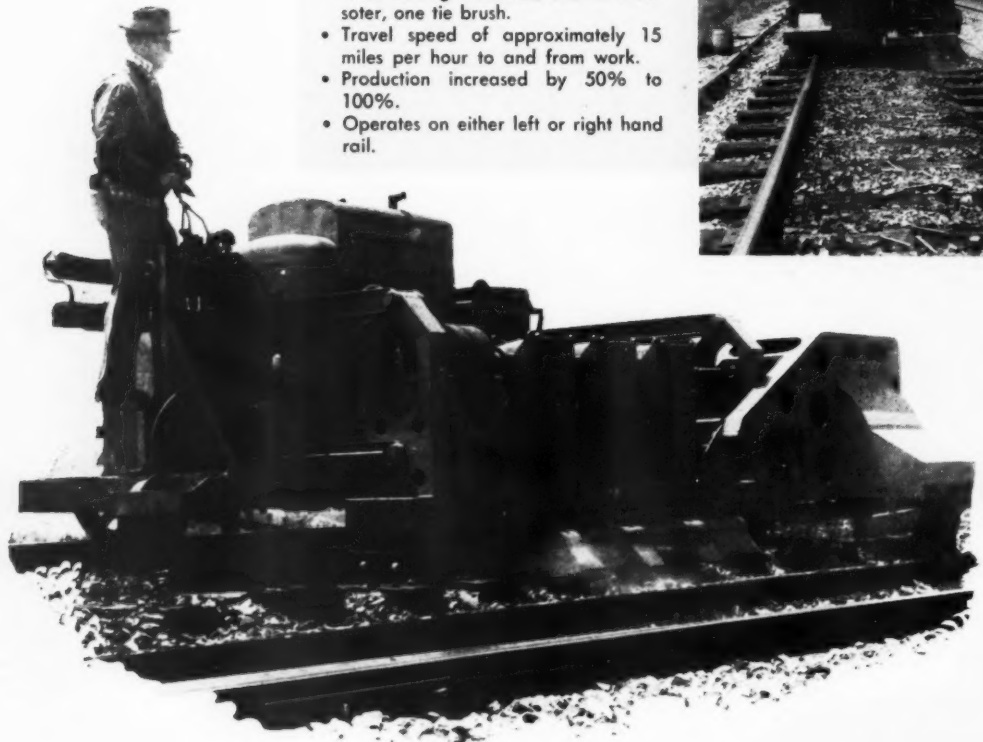
THE NATIONAL LOCK WASHER COMPANY, NEWARK 5, N. J., U. S. A.

A COMPLETE LINE OF RAILWAY SPRING WASHERS

The *KERSHAW* CRIB ADZE

features:

- All ties adzed in same plane eliminating necessity of spot surfacing behind rail laying.
- One-man operated.
- Will do job now requiring one kribber, three adzing machines, one tie creosoter, one tie brush.
- Travel speed of approximately 15 miles per hour to and from work.
- Production increased by 50% to 100%.
- Operates on either left or right hand rail.



The Kershaw Crib-Adze, operated by only one man, is capable of doubling adzing production in your rail re-laying gang.

A cribbing brush cribs between the ties while adzer heads adze the ties to desired depths, giving fast, economical operation.

Now . . . more than ever . . .

Recognize This Symbol of Leadership . . .

KERSHAW
MANUFACTURING CO. INC.

MONTGOMERY



ALABAMA



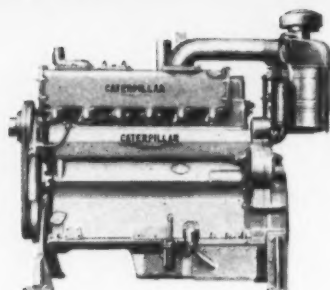
HEAT-TREATED STOCK RAILS IN NEW ENGLAND—The Bethlehem stock rails for these turnouts were supplied heat-treated. Reason: to retard the tendency of rail-head metal to cold-flow where wheel loads are transferred from switch point to stock rail. This greatly reduces the battering and cutting of rail heads and keeps the stock rails in service longer with less maintenance. Bethlehem can treat rails and switch points up to 60 ft in length, and has nearly a generation of experience in heat-treating techniques. A Bethlehem engineer will be glad to make an appointment to discuss your rail and trackwork problems in detail; you can get in touch with him through the Bethlehem district sales office nearest to you.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL



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A QUARTER CENTURY OF

A CATERPILLAR FIRST
—the "Hi-Electro" hardened
cylinder liner

A CATERPILLAR FIRST
—the chemically conditioned
cylinder liner



A CATERPILLAR FIRST
—the stainless-steel piston
protector

A CATERPILLAR FIRST
—the steel-backed aluminum
bearing



A quarter of a century ago, Caterpillar created mobile diesel power. For the first time, the power of the diesel engine was unleashed from its bulky foundations and put to work in the field—compact, economical. Here was diesel power of simple design, with no need for experts to operate and maintain. Here was diesel power with the lugging ability to knuckle down to the tough jobs.

The introduction of mobile diesel power was a tremendous advance in many fields. It provided efficient diesel power for tractors, motor graders, earthmoving equipment . . . for the work boat, the gin, the locomotive, the oil rig, the municipal plant . . . for *any* application in which steady, low-cost power is crucial. And everywhere, CAT® Diesel Engines proved themselves durable and dependable. They established Caterpillar as the leader in diesel engineering.

Today, hundreds of thousands of modern heavy-duty Cat Diesels are on the job in every corner of the world. And still the research continues. Study and experiment go ahead constantly in Caterpillar laboratories. Special testing machines help point the way toward new advances. Manufacturing techniques improve, too, in the world's largest diesel engine factory—where the quality of workmanship is the standard for the industry.

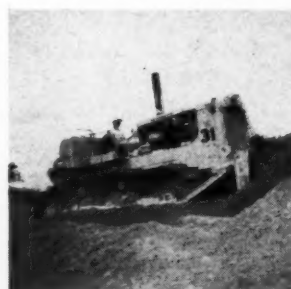
A modern world must have modern power—more and more of it. It is coming, in ever increasing quantity, from the production lines of Caterpillar, the leader.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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DIESEL POWER FOR PROGRESS



OF DIESEL LEADERSHIP

A CATERPILLAR FIRST

—interchangeable, adjustment-free
fuel injection equipment

A CATERPILLAR FIRST

—the capsule-type injection valve

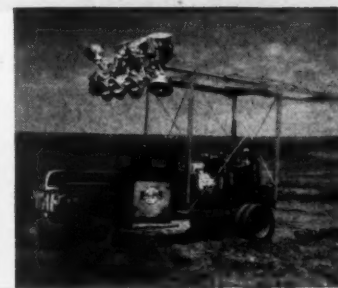
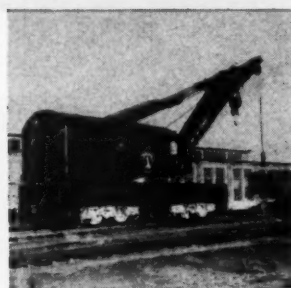
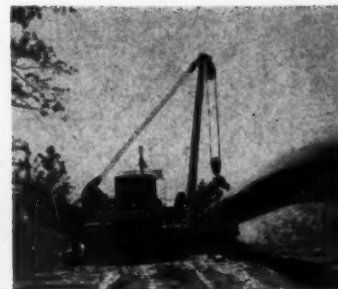
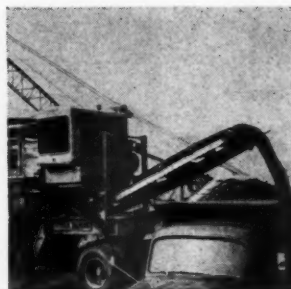
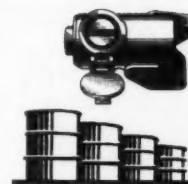


A CATERPILLAR FIRST

—the service meter

A CATERPILLAR FIRST

—superior lubricants
(detergent oils)





Railroad
handling
problems are
many—
and complex.

An ORTON
Crane is built
specifically
for each job.

Your
handling
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is our
problem.

We would
like to work
with you.
Please write,
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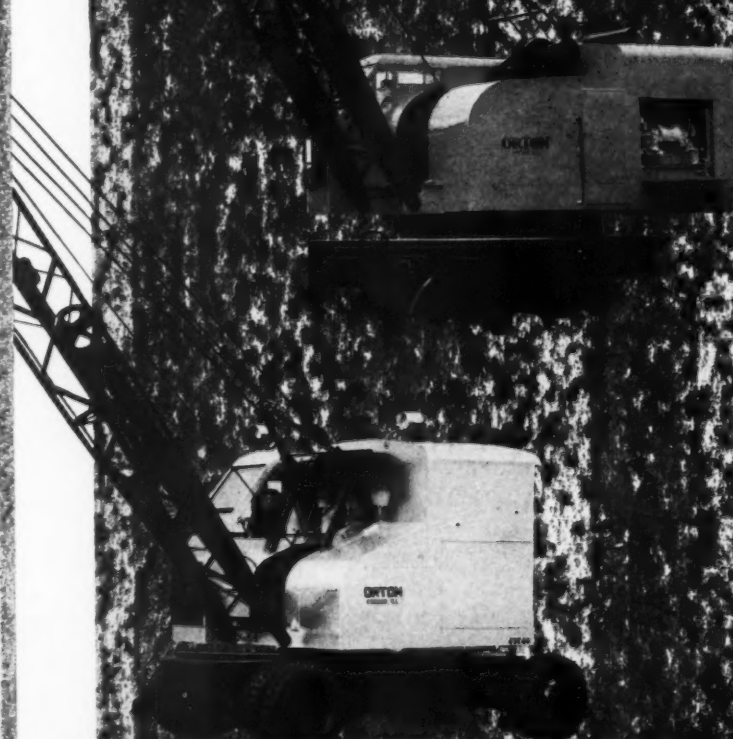
ORTON

Torque-Control

DIESEL CRANES

**For RAILROAD
HANDLING—**

**in the yard or
out on the line**



REPRESENTATIVES IN PRINCIPAL CITIES

SPERRY RAIL SERVICE CUSTOMERS SPEAK FOR THEMSELVES!

SPERRY RAIL TESTING HELPS SAFEGUARD AMERICA'S MOST TRAVELED TRACKS

"Sperry Rail Service plays a very important part in our operation... Each defective rail is a potential accident; its detection and removal eliminate that hazard."



Mr. R. J. Gammie
Chief Engineer
Texas & Pacific Railway
Company



"Sperry's testing effectiveness is shown by the fact that during... spring testing, 87% of the defects found were small size (under 20%)... This is valuable protection against delays to our heavy, high-speed trains."



Mr. B. Blowers
Chief Engineer
Erie Railroad Company



low cost per mile of track with Sperry Rail Service."



Mr. B. V. Bodie
Chief Engineer
Gulf, Mobile & Ohio
Railroad

"Constantly heavier loads and high speeds place an increasing burden on the rails, and track safety is more important today than ever before... The best defense is to test often enough to locate defects while small."



Mr. W. C. Perkins
Chief Engineer
Union Pacific Railroad



"A segment of track may look good and ride well, yet when Sperry reports a defect, we quickly relegate that rail to a yard or track restricted to light tonnage and low speed."



Mr. F. L. Etchison
Chief Engineer
Western Maryland
Railway Company



such unusual inspection possible and provide us with vital information concerning the condition of our rail."

Mr. Frank Aikman, Jr.
Chief Engineer
Long Island Rail Road



Detector Car operation by 70% through close cooperation with Sperry Rail Service personnel."

Mr. A. B. Stone
Chief Engineer
Norfolk & Western Railway



"We consider Sperry Rail Service testing as vital to economical maintenance as it is important to operating safety."



Mr. E. L. Anderson
Chief Engineer
St. Louis-San Francisco
Railway



"Detecting and replacing defective rails is of prime importance. That's why we have used Sperry Rail Service to test Missouri Pacific rail in track since 1931."



Mr. A. B. Chaney
Engineer
Maintenance of Way
Missouri Pacific Lines



"The vast industrial growth of Canada places an ever-increasing responsibility on the nation's railroads. I feel that Sperry testing has helped us keep pace..."



Mr. A. V. Johnston
Chief Engineer
Canadian National
Railways



"Sperry Rail Service has played an important part in building up the outstanding safety record achieved by Atlantic Coast Line in recent years."



Mr. R. L. Groover
Chief Engineer
Atlantic Coast Line



"Close cooperation between Sperry crews and division personnel make scheduling and operation of the Detector Car over our high-density track smooth and efficient."

Mr. S. R. Hursh
Chief Engineer
The Pennsylvania Railroad



These railroad officials are responsible for the condition of thousands of miles of track across the nation. Each has found that Sperry Rail Service gives high track safety at low cost.



After 46 years ARMCO pipe still serves efficiently

In 1910, a 48-inch-diameter plain galvanized Armco Corrugated Metal Pipe was installed as a culvert under the main line of the Chicago Great Western Railroad. It is at Mile Post 265.04, between Readlyn and Waverly, Iowa.

The culvert is still giving good service today!

Armco Corrugated Metal Drainage Structures have material durability and structural strength to meet railroad service conditions. Installation is easy and economical and there is practically no maintenance.

Armco Pipe diameters range from 8 inches to 15 feet. And pipe-arch structures are supplied in comparative sizes. Choice of gages to meet any strength requirement. For severe erosive or corrosive conditions there is Armco PAVED-INVERT or ASBESTOS-BONDED Pipe and Pipe-Arch. Armco Drainage & Metal Products, Inc., 3656 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.



ARMCO DRAINAGE STRUCTURES

ARMCO PRODUCTS FOR RAILROAD APPLICATIONS: Corrugated Metal Pipe • Pipe-Arch • MULTI-PLATE Pipe and Pipe-Arch • Bin-Type Retaining Walls • Perforated Subdrainage Pipe • Steel Buildings • FLEX-BEAM Guardrail • Tunnel Liner Plates • Foundation Pile Shells



This photo, taken in 1922, shows 48-inch-diameter Armco Corrugated Metal Pipe installed in 1910.



Recent photo of this 46-year-old Armco Corrugated Metal Pipe shows practically no change.

Announcing...

the amazing light-weight, compact

85 cfm GYRO-FLO

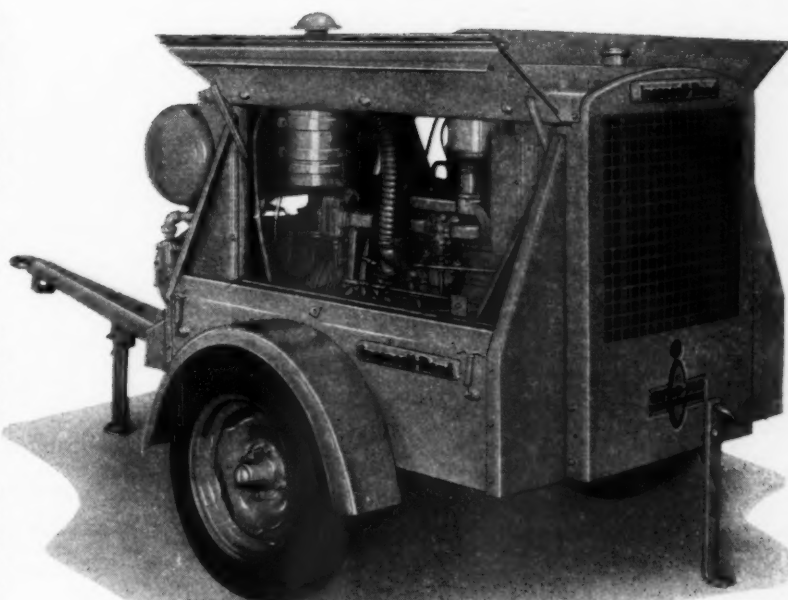
PORTABLE ROTARY COMPRESSOR

A new addition to the famous GYRO-FLO compressor line, this amazingly compact rotary delivers 85 cfm at 100 psi. It is by far the lightest portable compressor built in comparable capacity. Weighs only 1840 lbs—ready to go—fully equipped with tool boxes, fenders and two-wheeled spring-mounted running gear.

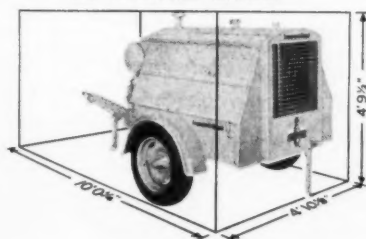
As a truck-mounted unit, the 85 GYRO-FLO weighs 1375 lbs and stands 42 in. high.

For your smaller jobs that need only 85 cfm of air power, this GYRO-FLO is certainly your best bet. It gives the same smooth, dependable, maintenance-free performance that characterizes GYRO-FLO compressors the world over.

With this new unit, the GYRO-FLO line now is increased to six sizes—85-125-210-315-600 and 900 cfm—the most complete line of portable rotary compressors available. See your Ingersoll-Rand representative for further details.



A LOT OF POWER
IN A LITTLE SPACE



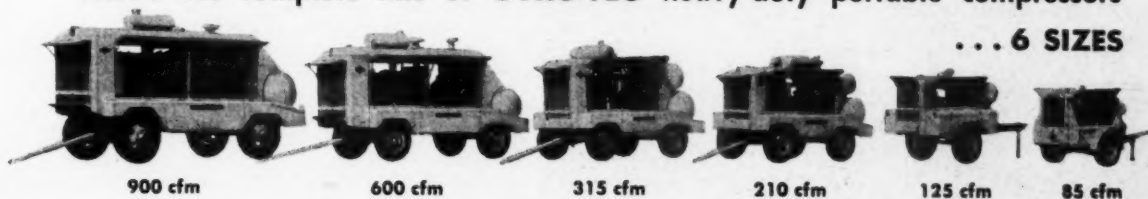
Ingersoll-Rand

2-432 11 Broadway, New York 4, N. Y.

An unbeatable combination...
GYRO-FLO Compressors and I-R Air Tools

Here's the complete line of GYRO-FLO heavy-duty portable compressors

... 6 SIZES



RAILWAY TRACK and STRUCTURES

NOVEMBER, 1956 7



for Fast—Accurate **RESURFACING**

... use these 3 **NORDBERG**

"Mechanical Muscles"®

HERE is another Nordberg Track Maintenance "threesome" that will save time and money and increase the quality of your resurfacing operations. Each of these Nordberg *"Mechanical Muscles"* is ruggedly built to do a specific job . . . and do it better, faster and at lower cost. Proved cost savings will soon write off your original equipment investment on each of these accurate track machines.

These three machines . . . the *Tamping Power Jack*, *Gang Tamper* and *Trakliner* . . . are typical of the more than twenty-five Nordberg *"Mechanical Muscles"* that have become the standard for efficient maintenance operations on the nation's railroads.

To stretch *your* maintenance dollars, it will pay you to make sure you have all the facts about the full line of modern, money-saving Nordberg track maintenance machinery. Write for literature on any or all of these Nordberg *"Mechanical Muscles"*.

NORDBERG *"Mechanical Muscles"®*

ADZING MACHINE • TIE DRILL • RAIL DRILL • RAIL GRINDERS • CRIBEX® • BALLAST ROUTER • TRACKSHIFTER • BALLASTEX® • SCREENEX® • GANG TAMPER • POWER JACK • HYDRAULIC and MECHANICAL SPIKE PULLERS • DSL® YARD CLEANER • TRAKLINER • SPIKE HAMMER • POWER WRENCH • TIE-KAT® • TAMPING POWER JACK • DUN-RITE® GAGING MACHINE and BRONCO • TRACK SURFACING DEVICE • GANDY®-TIE PULLER and INSERTER

R456

NORDBERG MFG. CO.
MILWAUKEE
WISCONSIN

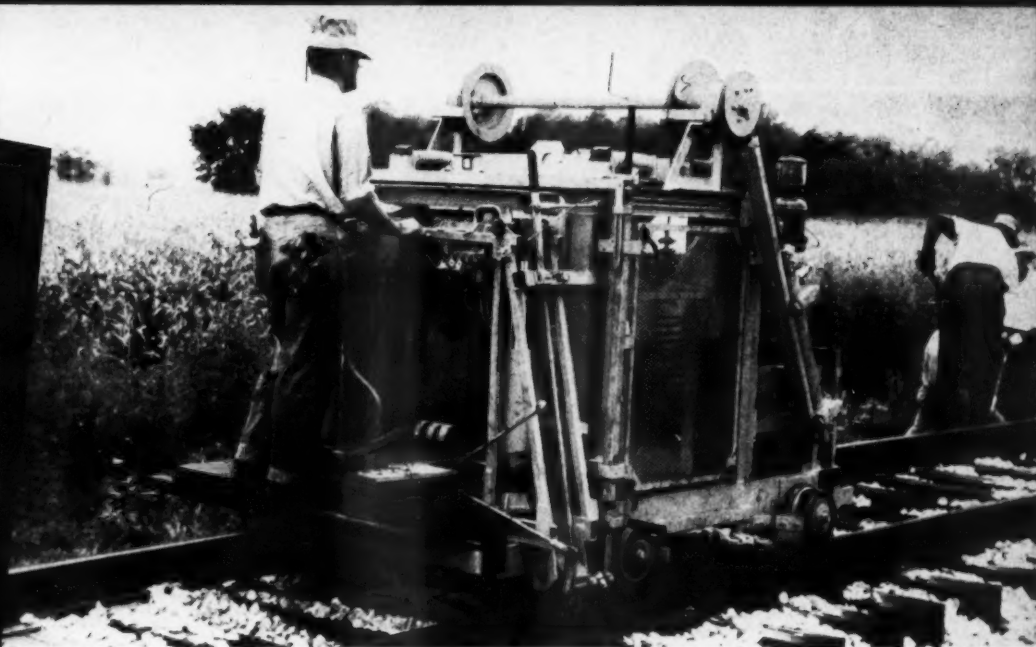


NORDBERG

Serving the Nation's Railroads for over 25 years

1 TAMPING POWER JACK

This new one-man machine combines many features of the Nordberg Power Jack and Gang Tamper. Designed for use ahead of gang tamping equipment, the self-propelled Tamping Power Jack raises track quickly, and solidly tamps ties to hold raise.



2 AUTOMATIC GANG TAMPER

Sixteen point tamping for raising or spot surfacing, this one-man machine tamps by impact, compression and vibration, with split tamping heads that tamp under one rail or both, as desired. Assures uniform quality tamping of every tie, every time, in any ballast. Has selective automatic or manual tamping cycle.



3 NORDBERG TRAKLINER

The track lining machine with two point rail contact for extremely accurate, kink-free line. Operated by one man and self-propelled, the Trakliner is faster and more accurate than any other lining methods.



How the



SAVES MONEY



the MANNIX way



Mennix Sled skeletonizes, redistributes ballast, in a single operation.



Old ballast falls through sled's "weep holes" and is levelled off; track settles on new roadbed.



This picture shows gradual rise of track to the sled, and gradual curve of re-settlement.

The St. Louis Southwestern must keep roadbed in top shape . . . for fast, heavy freight schedules on its famous "Cotton Belt Route". Hence the use of the MANNIX BALLAST SLED. Perfected by Mannix, this fast-paced equipment cuts maintenance costs . . . helps keep traffic on schedule. It can save you money, too . . . ask about the rental plan available!



1154 Northwestern Bank Building, Minneapolis 2, Minn.

Phone: FEderal 9-7709

NEW DESIGN BEEFS UP DERRICK, CUTS DOWN WEIGHT

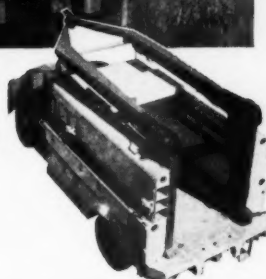
We made this new derrick with legs to please you. Fabricated and rectangular, they weigh 20 percent less than most side legs, yet they're about 25 percent stronger. The "bow-legged" shape keeps the cargo area open.

This derrick lifts 8000 pounds (has been tested at 14,000 pounds), body-loads 2,500 pounds, handles 65-foot poles. Operating range is 195°, and live-boom action gives you infinite lifting positions with a single-drum winch. *Like other Holan derricks, this one fits any body on its own supports. There is no need to rebuild or reinforce the body proper.*

There's much more to tell, so write us and ask about the Series 6700 Power Derrick.



Series 6700 Derrick mounted on Holan CLC-138 Construction Body. Notice new Holan corner window design for crew compartments.



J.H. HOLAN CORPORATION

4100 WEST 150TH STREET
CLEVELAND 11 OHIO

OTHER PLANTS

HOLAN CORPORATION OF GEORGIA, Griffin, Ga. • J. H. HOLAN CORP., Phoenix Div., Arizona

BRANTFORD-HOLAN LIMITED, Brantford, Ontario

THE NAME THAT MEANS WORK SIMPLIFICATION

All Holan bodies are made of H-tensile, rust-resistant steel 20 to 25% lighter than ordinary steels.

Line construction bodies for light to heavy-duty. Crew compartments optional. Efficient tool compartments and drawers.



Service bodies for chassis up to 1 1/2 ton. Lengths, 72", 84" and 102".



Aerial arm for spotting workmen 37 feet above ground, 9 feet below ground level. Double-basket unit extends 45 feet. Rotates 360°.



Live-boom, three-legged derrick lifts 12,000 lbs., 75-foot poles. Body-loads 5,000 lbs.



Mechanical ladders expertly engineered and counterbalanced for effortless handling. Maximum heights from 24' to 32'. Swings 360°; angles to 72°.



Portable hydraulic and mechanical earth borers. Augers for 8" to 20" diameters, depth to 8'.

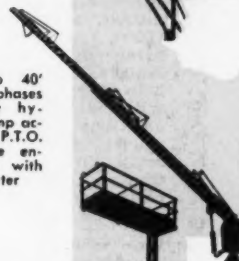


Hydraulic jacks, controlled from rear of truck. Rigid mounted or patented Holan self-stowing types.



Live-boom, two-legged derrick with fabricated, rectangular side legs—"bow-legged" design. Lifts 8000 lbs., 65-foot poles.

Live-boom, two-legged derrick with automatic hydraulic side-leg coupling. Lifts 6000 lbs., 70-foot poles.



Ladders to 40' with all phases completely hydraulic. Pump actuated by P.T.O. or separate engine drive with electric starter.



Hydraulic towers with rotary, stationary, or transverse platforms. Exclusive box-girder telescoping mast.

Presenting
another **NEW**
WISCONSIN
HEAVY-DUTY
Air-Cooled **ENGINE**



The **FULL-POWERED**
V-Type 4-Cylinder
30 hp. Model VH4

This rugged new engine has been added to the Wisconsin line to fill the horsepower gap between the Model VF4 25 hp. and the Model VG4D 36 hp. Wisconsin Engines. At the same time, the mounting base is dimensionally identical to the Models VE4 and VF4 to permit convenient replacement of the latter engines if greater power is required.

The Model VH4, which now makes its bow for the first time, is the most powerful engine of its type and size available today, in our estimation. It is an engine of basic High Torque design which gives it the important advantage of being able to deliver maximum usable *Lugging Power* that carries the load through the hard, heavy pulls. It has been designed to give you the best possible performance at all engine speeds from 1400 to 2800 rpm., even when operating under intermittent shock-loads or under constant load, continuous service.

The Model VH4 is a heavy-duty engine in all respects, built for hard service under all operating conditions, at temperatures from sub-zero to 140° F. (60° C.). It is an exceptionally smooth-running, even-firing engine and has all the traditional heavy-duty features that characterize all Wisconsin Models, from 3 to 36 hp. It can be supplied as an "open engine" with side-mount fuel tank, or as housed power unit and may be equipped with electric generator and starter (or starter only), clutch, reduction or clutch-reduction assemblies . . . and is adaptable to operation on a variety of fuels such as gasoline, kerosene, natural gas, Butane, Propane or fuel oil of 35 Octane rating or better.

Learn more about this new engine. Write for Bulletin S-196 for detailed data and engineering specifications.



STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946 (Title 39, United States Code, Section 233) SHOWING THE OWNERSHIP, MANAGEMENT AND CIRCULATION

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ROBERT G. LEWIS, Publisher

Sworn to and subscribed before me this 1st day of October, 1956.

(Seal) EDMUND J. PUYDAK
(My commission expires March 30, 1958)

now

much greater speed...

particularly on low raises and spot surfacing



Improved cam plate design—plus a special gun with a greater foot-pound blow—result in substantially increased tamping speed. In some cases, double the former footage has been attained in spotting and with solidified ballast conditions. A new style retainer allows fast changing of tamping tools to fit any ballast condition. *Write for Bulletin AT-56.*

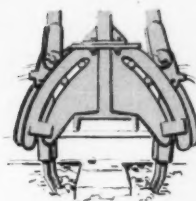
McWILLIAMS

TIE TAMPER



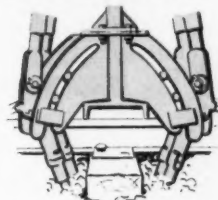
Railway Maintenance Corporation

PITTSBURGH 30, PA.



**IMPROVED
DESIGN
ASSURES
MORE
EFFECTIVE
TAMPING**

New cam plate permits guns to penetrate solidified or high ballast conditions rapidly.



Angle of cam directs maximum tamping under the rail bearing area of the tie.

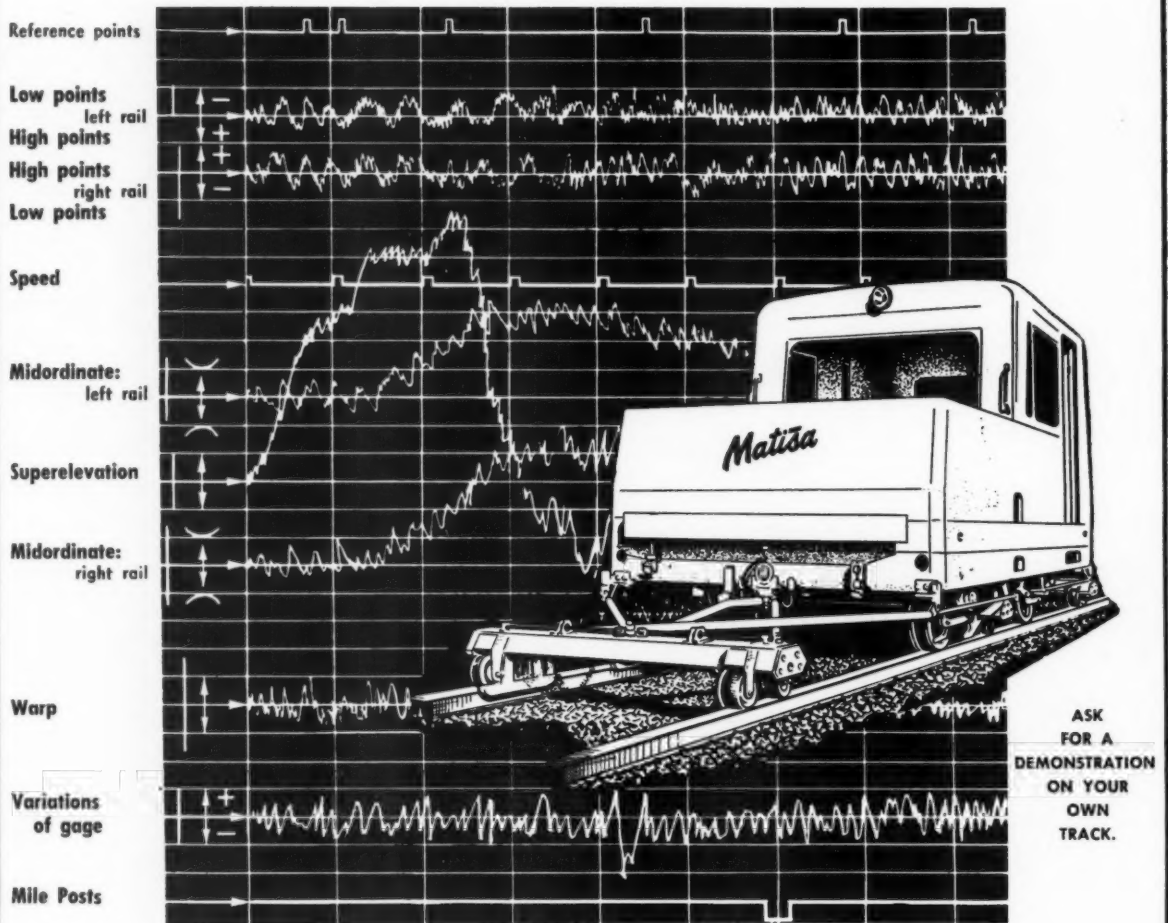
McWilliams Mole, Super Mole . . . McWilliams Tie Tamper, Crib Cleaner, Ballast Distributor . . . TieMaster . . . LineMaster . . . SpikeMaster . . . Tie Unloader . . . BoltMaster . . . GaugeMaster

NOW

Matisa

BRINGS YOU QUALITY CONTROL FOR YOUR TRACK MAINTENANCE

THE NEW MATISA TRACK INSPECTION CAR . . . is a complete mobile instrument for the accurate measuring and recording of track conditions, and the detection and locating of track defects.



ASK
FOR A
DEMONSTRATION
ON YOUR
OWN
TRACK.

The *Matisa* Track Inspection Car enables track-maintenance officers:

- (1) to record quickly and precisely the condition of track prior to starting programmed work;
- (2) to verify the effectiveness of completed work programs;
- (3) to maintain a graphic record of frequent inspections;
- (4) to create incentives for supervisory officers, foremen and men.

The *Matisa* EQUIPMENT CORPORATION
1020 WASHINGTON AVENUE • CHICAGO HEIGHTS, ILLINOIS

News Notes

... a resumé of current events throughout the railroad world

RAILWAY

TRACK *and* STRUCTURES

NOVEMBER, 1956

A 41 per cent increase in rail traffic by 1956 has been predicted by Holcombe Parkes, president of the Railway Progress Institute. Speaking before the Western Railway Club on October 8, Mr. Parkes told his audience that, "If you have faith and courage and resourcefulness and the will to capitalize on the great opportunity that lies ahead, no railroader or supplier can be pessimistic about the future of the railroad industry."

New construction activity by the railroads in September 1956 totaled \$40 million according to a joint estimate prepared by the Departments of Commerce and Labor. This compares with \$39 million in August of this year, and \$36 million in September 1955. In the first nine months of 1956 new construction activity by the railroads was estimated to be \$319 million—an 18 per cent increase over the first nine months of 1955 when it totaled \$270 million.

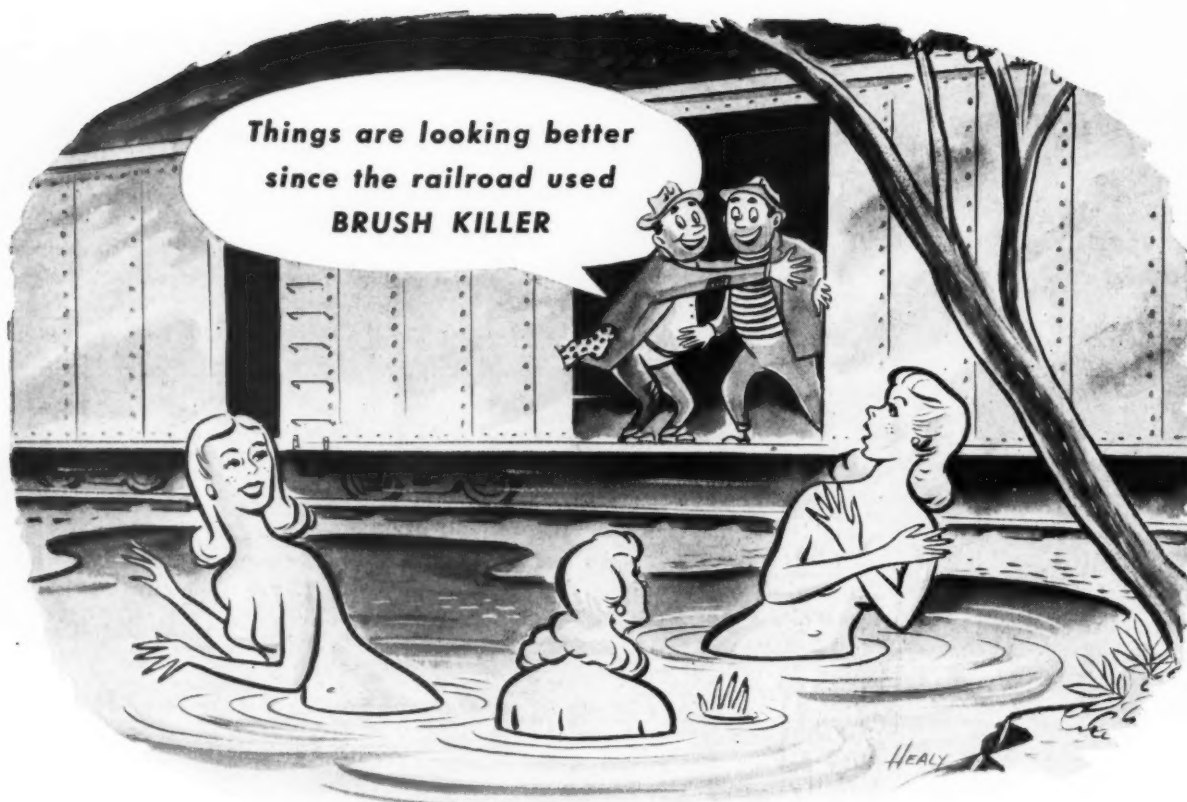
The United States Supreme Court has denied a plea that the so-called union-shop case be reheard. The court decided the case last May, ruling in effect that the Railway Labor Act's union shop provision overrides state "right-to-work" laws as to employees covered by the act. The unsuccessful suit was brought by a group of Union Pacific employees who are not members of any union and did not desire to join.

The experimental runs of the "Aerotrain" on the New York Central, which have been underway for six months between Cleveland and Chicago, ended on October 27. The road was operating the train under a short-term leasing arrangement with General Motors Corporation, which owns the equipment. The equipment will move to another road for testing.

Class I railroads in the first eight months of this year had an estimated net income of \$530 million, a decrease of \$49 million compared with the corresponding period in 1955. Estimated net income for August was \$87 million, down \$3 million from August 1955. The figures were reported by the Bureau of Railway Economics of the AAR.

The thirteen Regional Shippers Advisory boards have estimated that loadings of the 32 principal commodities in the fourth quarter of 1956 will come to 7,833,255 cars, an increase of 3.7 per cent compared with the 7,554,000 cars loaded in the corresponding quarter of 1955.

Twenty-five gas-turbine electric locomotives in service on the Union Pacific are running up to 800 miles farther and operating about 30 per cent more miles these days than they did when they first went into service 4½ years ago. They are hauling some 10 per cent of the UP's freight traffic. Longer runs without refueling are the answer. Fuel tenders coupled to the locomotives have cut fueling stops and enabled the UP to reduce its refueling facilities.



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Chemical Company, Inc.
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11 cu yd struck capacity
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4 forward speeds to 20.0 mph
reverse to 3.1 mph

TS-360

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20 cu yd heaped capacity
4 forward speeds to 20.0 mph
reverse to 3.1 mph



Shown above is an Allis-Chalmers Model TS-360 motor scraper and an HD-21 tractor.

get all

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Allis-Chalmers TS-360 and TS-260 motor scrapers are designed to meet the construction industry's ever-increasing demands for machines that will produce more, do today's jobs better and faster than ever before. Here are just a few of the advantages they offer for big-volume, low-cost earth moving.

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TRANSPORTATION DEPT., TRACTOR GROUP, MILWAUKEE 1, WISCONSIN

Consult the Allis-Chalmers dealer in your area for complete facts on the TS-360 and TS-260 motor scrapers.

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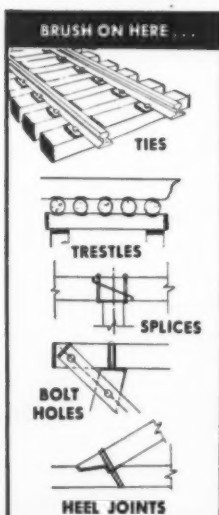
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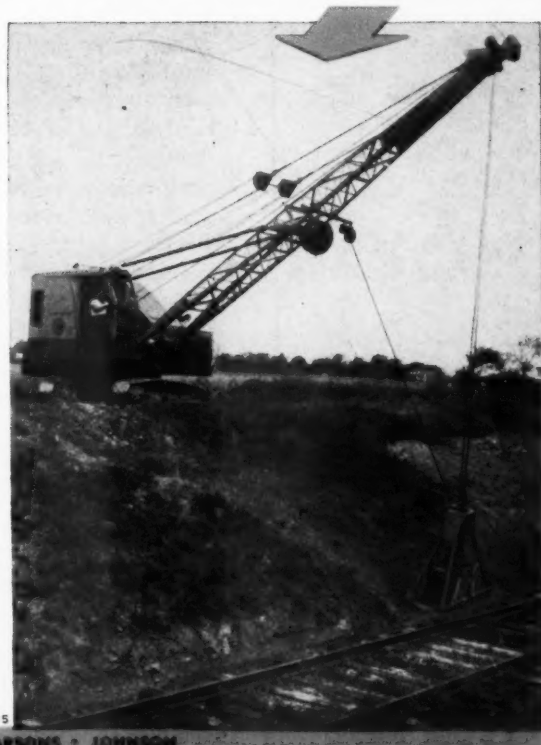
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Subject:

**Dear
Readers:**

RAILWAY

TRACK *and* STRUCTURES

A Matter of "M's"

Have you ever had occasion to feel that the management of your company seemed to be working at cross-purposes with you in your efforts to do a good job? You would indeed be an exception to the rule if you answered "no" to this question. There probably isn't a supervisor or foreman who hasn't, at times, felt that his management, by its decisions, was conspiring to prevent him from conducting his work in the best interests of the company.

I suspect that this problem arises most often where money matters are involved. You, as a supervisor, feel that you need so much money—or men, or materials, or equipment—to maintain the properties under your supervision in a safe and adequate condition. All too often what you get is less than what you think is necessary. So perhaps you feel that management doesn't have an accurate picture of conditions on the ground, or that for other reasons it has drawn the purse strings too tight. Maybe so, but on the other hand management may have perfectly logical reasons for its decisions—reasons based on considerations that are not readily apparent to you.

Don't think that management isn't also concerned about these apparent misunderstandings. The Canadian Pacific's president, N. R. Crump, recently devoted an entire speech to the subject. Management, he said, is concerned with the five "M's"—men, material, machines, money and the market. Its function, he said, is to bring these five M's together in such a way as to make a profit. The supervisor, on the other hand, manages a combination of men, materials, methods and machines. In other words he is not directly concerned with money and the market—and that makes a big difference.

In a large organization, said Mr. Crump, the supervisor most nearly approaches the function of the owner-operator of a small business. However, there is an important point of difference. Unlike the owner of a small business, the supervisor is "generally far removed from the direct disciplines of the market and of profit and loss," explained Mr. Crump. "These disciplines come down to him from top management through an intricate chain of links in the line and staff organization. The disciplines tend to lose their real purpose and meaning as they travel down the chain of command. Herein lies the danger of the supervisor becoming unable to identify himself with the main objectives of the undertaking in which he plays such a vital role."

Since Mr. Crump was speaking before a group of management representatives his discussion was primarily from the point of view of what management should do to help the supervisor identify himself with his company's overall objective. If supervisors are to achieve this identification, he said, they should hear occasionally how the company is doing, what some of the problems are, what plans are being made and what progress is being achieved.

There are two thoughts we can draw from these comments. One is that management's decisions, when they are not in accord with the supervisor's thinking, can frequently be explained by the obligation to give due consideration to money—the biggest M of all. The other is that there are many things engineering officers can do to help their supervisors achieve a high degree of identification with company objectives. It's simply a matter of good human relations.

MHD



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Your best defense against weeds on
 tough terrain... **Concentrated BORASCU®**



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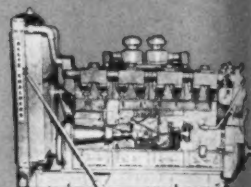
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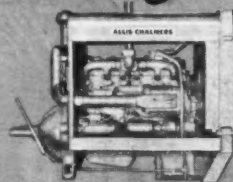
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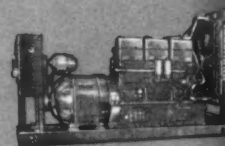
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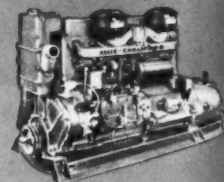
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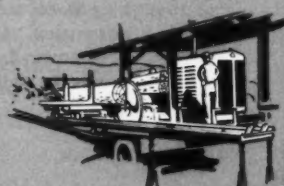
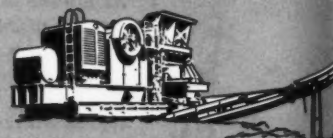


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Supplying to railroads the complete line of welding and cutting materials and modern methods furnished for over forty years under the familiar symbol . . .



S2 SERIES AA STANDARD SECTION CAR is powered by a new two-cylinder, two-cycle, water-cooled engine. Features include a differential front axle, extension lift handles and four-wheel brakes. Load capacity: 8 men, 1800 lbs.

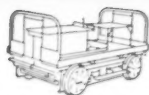


When you think of
**MAINTENANCE
TRANSPORTATION**

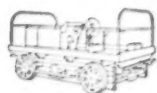
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M14 SERIES H LIGHT SECTION CAR can carry six men, yet can be operated by only two. Features include a steel frame, demountable wheels and a 5- to 8-horsepower engine. Load capacity: 6 men, 1200 lbs.



A5 SERIES C GANG CAR can pull 6 trailers loaded with 120 men at 30 m.p.h. Features include a 35-h.p. engine and special construction. Four-speed, two-way operation. Load capacity: 8 men, 3000 lbs.



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FAIRMONT TRAILERS available for all Fairmont section and gang cars are designed for rugged service. Available in load capacities of 1,000, 2,000, 6,000 or 10,000 lbs. A wide range of accessories is also offered.

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If it is your responsibility to see that maintenance crews are transported quickly and safely, put Fairmont on the job. Fairmont section and gang motor cars provide rugged dependability that is unmatched in the field. And they are backed by nearly fifty years of experience in design . . . engineering . . . and manufacturing. If you desire detailed literature on any Fairmont product—or if you would like to talk to one of our experienced representatives—contact Fairmont today. You'll be glad you thought *first* of Fairmont.

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RAILWAY TRACK and STRUCTURES

RAILWAY

TRACK *and* STRUCTURES

NOVEMBER, 1956

Vol. 52, No. 11

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NOVEMBER, 1956 27



Bulldog anchor with 25% more grip . . .

UNAFFECTED BY FROZEN BALLAST

When moisture and freezing weather team up, they can work real damage to right-of-way. Ballast expands, heaves, freezes. BULLDOG Rail Anchors are particularly effective under these winter conditions. There's no flat bottom surface for heaving expanding ballast to press up against. It's simply diverted away from the anchor (see arrows, upper photo). That's why BULLDOGS won't shift or loosen their powerful 25% stronger grip.

Further, frozen ballast has no resilience, no give. This places an added burden on both the tie and anchor often causing excess tie wear and anchor slippage. You can reduce this wear and slippage to a minimum by making sure all rail is sufficiently and securely anchored. Use BULLDOGS and you can be sure it's secure. But use enough of them to be sufficient to meet your particular track conditions. Thus, load will be divided over more ties. The resulting lighter load per tie in

combination with BULLDOG's broad, deep and flat tie-bearing surface (whitened area on upper-left anchor) reduces tie wear to a minimum.

Only with BULLDOG can you get such high holding power. Only with BULLDOG can you get the broad, deep and flat tie-bearing surface. Only with BULLDOG can you be absolutely sure your rail will remain properly anchored throughout the severe winter season. Why not take a trial order of BULLDOG Rail Anchors now and prove these things yourself! True Temper Corporation, Railway Appliances Division, 1600 Euclid Ave., Cleveland 15, Ohio.

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BULLDOG Ballast Forks, Weed Cutters, BULLDOG Shovels, BULLDOG Safety Rail Forks, Hammers, Sledges, BULLDOG Scythes

 **TRUE TEMPER®**

BULLDOG RAIL ANCHOR



25% greater holding power . . . one unit . . . applied by one man . . . using any striking tool

The Santa Fe, with many timber pile trestles to maintain, wanted pile drivers with the latest features and with the ability to carry out any regular or emergency job under any conditions. All its requirements are incorporated in two new . . .



HYDRAULIC RAMS are used to set forward and side batter and for raising the 60-ft leads.

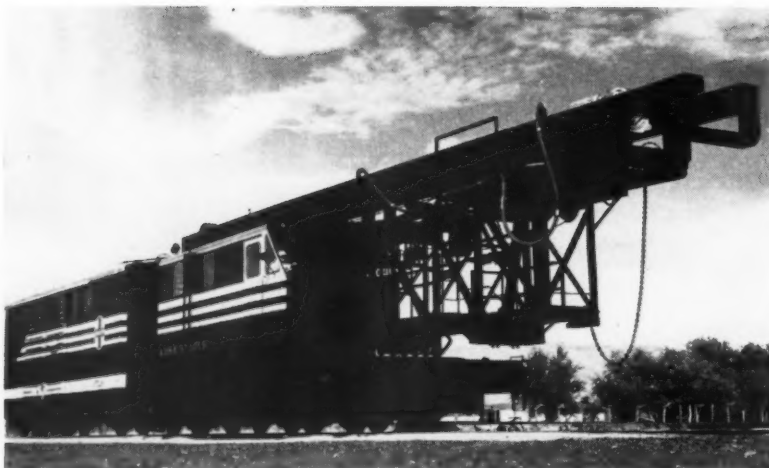
. . . Custom-Made Pile Drivers

Santa Fe's New Pile-Driving Outfits Have These Special Features . . .

- Separate compressor car which may supply air for other uses
- Diesel engine with torque converter
- Hydraulic controls for raising leads and setting batter
- 25,000-lb hammer-and-pile line capacity at full working radius
- Equipment for jetting piles in place
- Boring machine for hard digging and for starting longer piles
- Power supplies for operating both air and electric tools
- Equipment for floodlighting work area.

● Santa Fe bridge engineers have definite ideas regarding the features that should be included in a modern pile driver. They figure that a pile driver should be a self-contained unit with features designed to give it the necessary versatility to operate under a wide range of normal and unusual job conditions.

These ideas have now been converted into reality in the form of two new on-track pile-driving outfits. Each outfit consists of the pile-driver itself, built by the Orton Crane & Shovel Co., and a compressor car and an idler car, both built by the railroad. One outfit is scheduled for use on the Eastern Lines, the other on the Western Lines.



COMPLETE OUTFIT is comprised of the driver, a compressor car and an idler car (not shown). Latter is needed to accommodate leads while traveling.



COMPRESSED AIR for the hammer is supplied by two 600-cfm compressors.

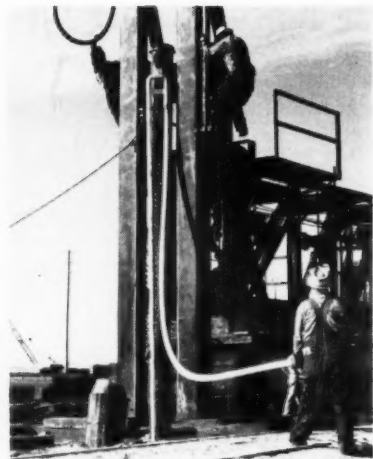
Being convinced of the economic soundness of creosoted timber-pile trestles the Santa Fe continues to maintain a large mileage of such structures. Thus it has constant need for pile-driving equipment for renewing and repairing its trestles and for performing other types of pile-driving jobs. Obsolescence of its existing pile drivers had created a need for new and more efficient equipment.

Why Compressed Air Is Used

The hammer on each of the outfits is a Vulcan 50C pile hammer with a rated striking energy of 15,100 ft-lb and can be operated by either air or steam. However, the Santa Fe elected to use air instead of steam to actuate the hammer because the supply of boiler water is practically non-existent on much of the Santa Fe which has been fully

dieselized for several years. The road also took a look into the future when it might want to use a self-contained diesel hammer or a hydraulic hammer on the new driver, in which case the compressor car, which is detachable, can be used elsewhere for other projects which require compressed air.

The pile driver is of the self-contained, revolving, locomotive type and is provided with the necessary mechanism for performing by diesel power the operations of hoisting, rotating, traveling and operating the pile-hammer leads. It is powered by a package unit consisting of a 300-hp, 6-cycle General Motors diesel engine with a fluid torque converter, which is capable of propelling the driver at speeds up to 24 mph on a level track and can negotiate alone a 5-per cent grade. On a straight, level grade the driver can pull 10 loaded cars



JETTING equipment is an auxiliary carried by each of the pile drivers.

weighing 70 tons and one such car on a 4-per cent grade. The power unit is mounted on the turntable deck of the machine and propels the driver through pinions and gears.

The railroad chose this means of propulsion because it is anticipated that the driver may be frequently called upon to repair the ravages of flash floods. Through experience the road has learned that, while repairing bridges damaged or washed out by one flood, a second frequently occurs within a relatively short time. If the driver were propelled by a diesel-electric transmission, it might be impossible for it to extricate itself from six to eight inches of water, whereas, because of the mechanical transmission used, the new machines could get themselves out of two to three feet of water.

The turntable is carried by a 100-lb rail, bent into a circle 9 ft 11 in. in diameter, and it rotates on flanged rollers, any one of which can be removed for replacement without jacking up the upper structure.

The leads are supported by a trussed frame and the whole assembly is counterbalanced at the rear of the turntable. However, outboard rollers, mounted under the tail of the turntable and also under the lead supporting truss, provide additional support to the truss while driving piles close to the track.

Leads Raise Hydraulically

The pile driver has 60-ft leads which permit placing a 50-ft pile under the hammer and still clear the top of rail. An interesting fea-



EARTHBORING MACHINE is used for starting holes where hard driving is encountered near the ground surface and also for piles longer than 50 ft.

ture of the leads is that they are raised and lowered by a hydraulic ram instead of the conventional raising cables. This ram also tilts the leads so as to provide a forward batter in 1-in increments up to 3 in. in 12 in. Other hydraulic rams tilt the leads laterally so as to provide side batter up to 2½ in. in 12 in. In any of these tilted batter positions the leads can be firmly locked. The hydraulic pumps receive their power from the diesel engine.

Although the Vulcan 50C pile hammer is of sufficient size to drive steel sheet piling, timber piles, H-beam piles and concrete piles, the road has made a provision in the spread of the lead guides to permit the use of a Vulcan 80C pile hammer in case long 24-in diameter concrete piles are to be driven. The 50C hammer has been made to fit the spread of 26½ in, which is the dimension necessary for the 80C hammer.

Additional contingencies have been provided for in this outfit. For use where hardpan is encountered near the ground surface and where driving may develop little penetration or induce brooming of the pile, a Ka-Mo earthboring machine has been furnished. This drill can bore through hard material and is operated by a 12½-hp air motor. It is held in position by the leads but works in front of them. The earthborer can also be used to dig holes for piles longer than 50 ft.

Sometimes jetting of the piles in place becomes necessary, and the railroad has provided for this contingency by equipping the driver with jetting equipment. This includes all the necessary hose and pipe connections and a Jaeger pressure pump. The pump has a 5-in suction intake and a 4-in outlet and

has a capacity of 700 gpm at 100 psi, 525 gpm at 150 psi, and 100 gpm at 275 psi.

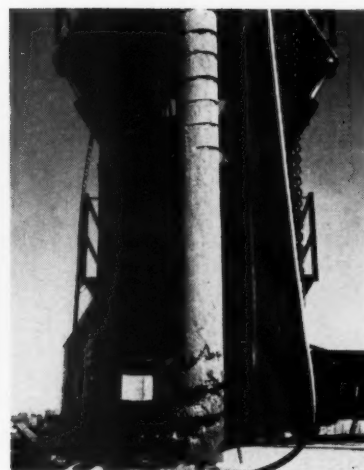
Has High-Capacity Leads

In working position the leads will drive piles 22 ft ahead of the leading car axle. The leads have a pile-and-hammer capacity of 25,000 lb at full working radius, but this can be increased to 35,000 lb when the outriggers of the car body are extended and properly set.

The leads are constructed of steel shapes and plates welded together and rigidly held by U-shaped yokes of I-beam construction spaced about 8 ft apart. A deflecting roller is mounted near the upper end of the leads to keep the pile line clear of the hammer when it is near the top of the leads. A hammer rest, actuated by two hemp ropes, is provided to hold the hammer 12 in below its highest position.

The engine, gear mechanism, 150-gal fuel tank, 18-cfm compressor, 2.5 kw generator and operator's seat and controls are housed on the turntable deck in a steel cab. The cab has windows of shatter-proof glass and two sliding doors, one on each side.

All controls are air-operated. A 2-in pipe line has been mounted along the side of the car body of the pile driver to carry the air supply from the compressor car to the pile hammer. To prevent the pile-hammer hose from dragging on the ground, another pipe was fastened half-way up to the leads, and short hose connections made between this pipe and the hammer. Two large line oilers were installed in



WHEN LOADED, the auger is pulled up by an auxiliary pile line on leads.

the air-supply line for lubrication of the hammer and also to allow the introduction of an antifreeze compound if necessary.

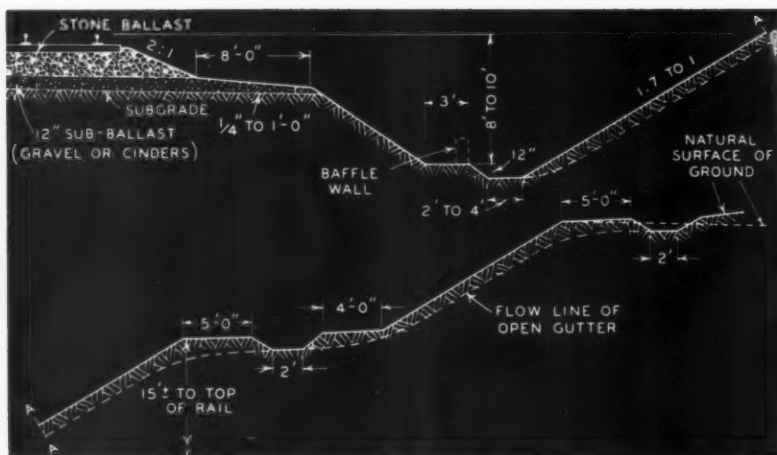
Train-line control and additional air supply for the air brakes are also provided in the cab. This arrangement makes it possible to apply the brakes in a train of cars being hauled by the driver.

The 2.5-kw generating plant in the cab of the pile driver furnishes single-phase, 60-cycle, 110-volt alternating current for a lighting system. Two 500-watt floodlights are mounted on the front end of the cab and another is mounted farther back to throw light on the upper portion of the leads. This generating plant also supplies two lights in the cab, two red-warning lamps at the rear of the cab, and two outlets convenient for attachment of an extension cord and trouble light.

The idler car is a flat car, 44 ft 6 in long, over which a portion of the leads will project while in a lowered position for traveling. At one end of the idler car is a small building for housing a jet pump and an earth drill, and some of the small tools and equipment required for pile-driving operations.

The compressor car is a furniture box car, 40 ft 9 in long, taken from revenue service, and contains two 600-cfm Gardner-Denver diesel-engine-driven rotary compressors and a 5-kw generator. The air compressors supply the power for operating the pile hammer of the driver as well as the power needed for operating air-driven bridge tools. The electric generator is for supplying the energy needed on jobs where electric power tools are employed and also for powering a floodlight system which might be needed for night work.

How PRR Dries Up Its Roadbed



Design for Better Drainage

Deep side ditches are the standard on the Pennsylvania. A berm and an intercepting ditch are constructed where the top of the cut is about 15 ft above the top of rail, and at additional heights of

from 7.5 to 15 ft, to divert water away from the track. Paved open gutters are provided at required intervals and the discharge ends are protected by baffle walls to relieve the upper ditches.

● "The only way to maintain a railroad economically is to dry up the roadbed. We feel it is cheaper to provide adequate drainage to get water out and keep it out than it is to consistently combat the effects of water in the roadbed." This is the way L. E. Gingerich, the Pennsylvania's assistant chief engineer, maintenance, explains the reasoning behind the road's policy of constructing deep side ditches.

Any track-maintenance man who has traveled over the easterly portion of the Pennsylvania must have noticed and pondered about these deep side ditches. He also must have noticed that extensive grading was involved at some locations to place these ditches at least 18 ft from the nearest track.

This work began about 1940 when the road completely redesigned its drainage standards and inaugurated an extensive program of widening and deepening its

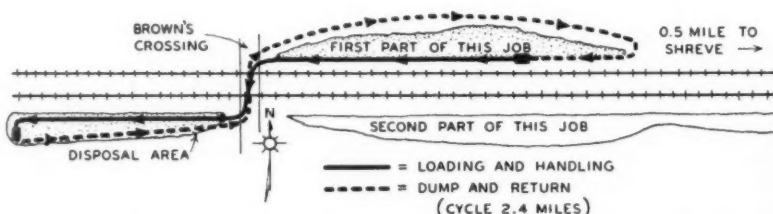
Typical example shows equipment used and procedure followed in

Typical of the drainage work done by the Pennsylvania grading outfits was the job of deepening the side ditches on both sides of the tracks and reshaping the cut slopes to the new standard in a long cut at Brown's crossing near Shreve, Ohio. The flow lines of the ditches were carried down to an approximate depth of 12½ ft below track level and their fall was made from 3 ft at Brown's crossing to 16 ft in a distance of 4,000 ft.

The crew consisted of eight men, which included the general foreman, M/W repairman, five engineers of work equipment, and a cook. Including travel time to and from the job, the crew worked an 8-hr day for five days each week.

The equipment used included three Model C Tournapulls, one Tornadoizer and one Caterpillar D7 bulldozer. The Tournapulls traveled a cycle of 2.4 miles in loading, handling, dumping and returning to the job site. The excavated material was used to build up a low section of the right of way.

Work started on one side on May 1, 1955, and continued until the one side had been completed. The outfit then crossed over the tracks to the opposite side.



ROUTE of machines in loading, unloading and turning is decided by foreman.



AFTER clearing the site, a new path is constructed for relocating the poles.

Grading outfits are deepening side ditches to promote better drainage, and are doing other jobs, such as widening cuts and fills and digging channel changes.

ditches. Minimum depths of from 8 to 10 ft, depending on the ground-water level and right-of-way conditions, were established. Extensive geographical and geological studies were conducted and test borings and soundings were made along the line. At some locations the natural water table was found to be so high that it was necessary to include the intentional lowering of the water table as part of the corrective drainage program. Sometimes this meant that the flow line of the ditches had to be extended a considerable distance downstream to intersect a streambed. In a large number of cases (and this situation prevails even today), it was necessary to purchase additional right of way to provide not only for the ditches to the new standard but also, in many instances, for the wasting of the excavated materials.

In the early years of this program, various types of equipment

were used in constructing these deep ditches, including crawler cranes, ditchers, shovels, and dump trucks for disposing of the material. A Gradall machine also was utilized.

Equipment Used

In 1946, the Pennsylvania tried out a rubber-tired earthmoving scraper. This machine was a small 2-cu yd Tournapull of the type originally designed for the U. S. Army as an air-borne unit for use during World War II in constructing advance air bases. This scraper was used by the road mainly for cleaning and maintaining existing ditches. Experience with this small unit led the road to rent a Model C Tournapull Roadster for use in maintaining existing ditches and for the construction of new drainage facilities.

In 1949, the road purchased three

Model C Tournapulls, each having a capacity of 13½ cu yd, and a Model Super C Tournadozer. Later, three of the Model D Tournapulls, each with a capacity of about 7 cu yd, and an Allis-Chalmers bulldozer were purchased. The three larger Tournapulls are worked in one outfit and the three smaller scraper units in another.

How Men Are Trained

Before putting these machines into service, however, the Pennsylvania selected 10 men as operators and mechanics and sent them to the manufacturer's service training school. There they received a special two-weeks course in the operation and maintenance of the machines. The men reported that the course gave them valuable training in the dismantling, repairing and reassembling of the units.

This prior training was essential

reshaping the ditches and slopes in a long cut to the new standard



TOURNAPULL maneuvers into position for loading.



TOURNAADOZER gives scraper a push while loading.



LOADED, and with scraper pan up, Tournapull takes off in high gear.

"Although clearing and the construction of the roads will usually require the better part of two working days, this work is very important . . ."

because the road employs these operators (whose titles are engineers of work equipment) and repairmen on a year-round basis. Grading work usually starts about the middle of April and continues until the end of November or early December. The machines are then taken to some vacant railroad building or, if such a building is not available, to a nearby rented building where they are dismantled, repaired and put in top running condition for the next year's operations. This work is done by the repairman (one assigned permanently to each outfit) and the engineers of work equipment.

The road reports this plan not only results in better maintenance and performance of the units, with minimum downtime during the working season, but also serves to hold the crews together. However, only a few of the original group of trainees are left, most having been promoted during the course of time to other positions on the road. Their replacements, under the guidance of the repairmen and remaining original trainees, learn to maintain and repair their own units through actual experience.

When it is noticed that parts of a machine are showing excessive wear, the foreman of the grading outfit orders the necessary parts through the road's local general foreman of work equipment. The general foreman, making use of a special procedure arranged with the purchasing agent, procures the parts promptly, often driving to the

nearest manufacturer's distributor to pick up and deliver them to the outfit. The parts are then installed on the machine by the repairman and the engineer of work equipment.

Housed in Camp Cars

Each outfit is comprised of four engineers of work equipment, a permanently assigned repairman, and a foreman. The men are housed in camp cars set out on the nearest siding. Five cars are assigned to each outfit. One is a foreman-recreation car, another serves as a kitchen-diner, another as a sleeper, and the other two are for tools and supplies. A bus for the transportation of the men between the camp and job site is also assigned to each outfit.

When the outfit is moved to another location, the cars are moved by train but the Tournapulls, bulldozers and bus travel under their own power over the highways. Before the highway movement can be made, however, a special permit must be secured for each machine from the state police. This permit, which is valid for 10 days, shows the point of origin, destination, route to be taken, weight, height and width, etc.

When a project is to be started the local track supervisor lines up the work to be done and stakes are set to insure proper slopes for the grading and flow lines for the ditches. The first work that the grading crew does is to clear the

ground of trees and brush. This material is cut up with a chain saw and burned. It is generally necessary to move the pole lines to a location farther from the track. The forces of the communications and signal department cooperate in doing this work, using a pole-hole digging machine. Where additional right of way is purchased the fences also are moved by the track forces.

The foreman of the grading outfit then decides on the procedure to be followed—the routes of the machines in loading, unloading, turning, etc.—and construction roads are built where necessary to permit high-gear movement except when loading. Although clearing and the construction of the roads will usually require the better part of two working days, this work is very important and makes the difference between high and low production, to say nothing about the strain on the machines which would result if they were largely worked in low gear over bumpy terrain.

The machines either bench their way up from the bottom of the existing side ditch or down from the top of the slope, depending upon the angle of incline. In some cases where it is necessary to start operations in an existing ditch which is too narrow for practical operation, the pioneering work is handled by a Gradall which enlarges the ditch sufficiently with a 3-cu ft bucket to allow entry of the Tournapulls. In general, however, the machines work down from the top of slope, especially where side-hill construction prevails.

The side ditches are constructed with a 4-ft bottom and with 1.7-to-1 slopes. By locating the top of the nearest ditch slope 18 ft from the track, sufficient room is provided for the movement and operation of track-maintenance machines.

Costs vary widely, ranging from 20 to 60 cents per cubic yard, depending upon the types of excavation and the length of the hauls. Where solid rock is encountered it must be shot before removal, increasing the cost. However, the cost of the work with railroad forces and equipment represents a saving under what the cost would be if it were done under contract.

Where the work involves extensive excavation, as in one case where 86,000 cu yd were removed, the two outfits work together.

Believes in a Good Neighbor Policy

In line with the road's policy of fostering a spirit of neighborliness with the townspeople and farmers located along its lines, the grading outfits have reclaimed acres of land which were unsuited to cultivation by using surplus material from drainage excavation to fill holes and level off the ground on adjacent property at no charge to the farmers. In one instance 16,000 cu yd of material were used for this purpose.

In one town, where several houses had been moved or burned, the abandoned basements were filled in, as were also several de-

pressions. In another instance, while the outfit was waiting in early April for a cut to dry sufficiently before beginning work, the outfit moved into a town and completed a small cleanup and drainage project on railroad property involving 3,300 cu yd of material. In another instance it built up an inadequate road in the community to make it wider and higher.

All work of this nature not only promotes good public relations but often provides the railroad with a site on which to dispose of excess excavated material, according to officers of the road.

What Tie Pads Mean to the MTA

On the elevated structure of the Metropolitan Transit Authority at Boston it costs more than \$38 to renew a tie.

Some years ago, as an experiment, tie pads were installed under 292 ties on a curve. Already eight years' additional life has been obtained, and the ties and pads are still in use.

In 1949 the road began applying tie pads on curves of the elevated structure as standard practice. This year, their use was ex-

tended to tangent track on a regular basis.

The material cost for a tie installed in the company's ballasted tracks is only \$5.50, but the installation cost is very high (\$12.50 per tie). Hence, even though these ties have a longer service life than those on the elevated structure, new ties in such tracks are now also being installed with tie pads.

It boils down to this: All new ties now inserted on the MTA are provided with tie pads.

● "I attribute much of the savings made since 1947 in track maintenance of the Rapid Transit Lines to the use of tie pads," said E. B. Myott, superintendent of engineering & maintenance, Metropolitan Transit Authority of Boston, Mass., when discussing the maintenance of tracks. "We are also using sealing coats for ties, larger tie plates, and a new type of restraining rail and brace on curves," he continued, as he displayed a model of the new assembly. But he was enthusiastic about the road's use of tie pads and he has impressive records to back up his enthusiasm.

The MTA serves the metropolitan area of Boston and includes third-rail and pantograph electric trains operating on elevated structures, in subways and tunnels, over viaducts, and on open track, as well as trolley cars, buses, and trackless trolleys operating on the streets of the city. There are 64.3 miles of Rapid Transit track and 19.7 miles of track where P.C.C.-type cars operate on high-speed line.

Plate Cutting Was a Problem

The tracks are laid with 85-lb running rails on tangents with most curves of 100-lb rail construction. The restraining rails are of 85-lb section. Car weights are relatively light as compared with most Class I railroads, although some weigh more than 63 tons when loaded. However, traffic is very dense and caused severe plate cutting of the ties, so that the average tie life on both the elevated tracks and the open ballasted tracks was 9 years on curves, and 16 years on tan-



SHARP CURVE where ties were to be removed in 1948 because of plate cutting. Instead, they were adzed, Bird tie pads applied, and are still in service.

gents. In the tunnels and subways, where the ties remain in a relatively dry condition, the original construction (some since 1898) is still in use at many locations.

Plate cutting of the ties in the subways and tunnels is not as serious as in the open since it develops at a much slower rate. However, it is a factor to be reckoned with because some lateral motion does occur to the tie plates particularly on curves which combined with sand and moisture drippings from cars, eventually causes tie cutting.

The ties used on the ballasted track, both in subways and on reservations, are 6-in by 8-in by 8-ft creosoted pine, except that every third tie is 9 ft in length for accommodating the insulated third-

rail support. However, the ties which are used on the elevated structures are all sized and framed to suit the girder supports, which may not be level with each other and vary in width. These factors add greatly to the cost of installation as well as to the cost of the tie itself. In addition, every fourth tie supports the third rail. All ties on tangent track have timber guard rails fastened to them on both sides of the running rails, while, on curves, no inner timber guard is installed on the short side of the curve when the restraining guard rail is in place.

Tie renewal on the elevated structure is not an easy chore. Because of the difficulty of installing ties on curves, it is the practice of

the MTA to renew the ties of several rail lengths at one time. Each tie location must be measured and a careful record kept. The relative elevations of the girders on the high and low sides must be carefully noted so that the undersides of the ties can be framed accordingly, giving consideration, of course, to the amount of superelevation at each tie. The thickness of each tie over the low girder must be such as to produce a uniform plane from one tie to another. After framing, each tie must be given a certain designation to insure that it will be installed at its exact intended location.

Tries Out Tie Pad

Because of the difficulty and expense of making tie renewals, both on the elevated structure and on ballasted track, the road was anxious to find some means of lengthening the service life of the existing ties. In 1947, the MTA began experimenting with tie pads. These were placed on the existing ties on a curve after they were adzed down by hand, and a coating of creosote brushed on. Total cost was \$4.11 per tie (labor and pads).

One test was made with the Bird self-sealing tie pads on 292 ties located on a sharp curve on the elevated structure, which consisted of 7- $\frac{3}{4}$ -in by 12-in tie plates under the outer rail, and 7- $\frac{3}{4}$ -in by 12-in tie plates, and 7- $\frac{3}{4}$ -in by 24- $\frac{1}{2}$ -in restraining rail braces alternated under the inner rail. This test proved so successful in prolonging the life of these ties under difficult curve conditions that the MTA

Expensive bridge ties frequently looked like this . . .



SOME of the most severe plate cutting occurred at the outside ends of the brace plates. The ties are cut from $\frac{3}{4}$ to 1 in deep, making maintenance difficult.

has now adopted tie pads as standard construction.

In making this test, the road believed that if an expenditure of \$4.11 per tie would prolong the life of the existing ties on this curve for four more years, this investment was well justified because it would cost approximately \$31 per tie to renew them. In other words, an investment of 13 per cent of the renewal cost would produce 45 per cent more service life. A renewal cost of \$31 per tie (1948 prices) may seem to be too high to some railroad men, but the table shows

how it is computed on the MTA. At today's wages and material prices, this cost would be \$38.10 per tie.

Tie Life Is Doubled

Instead of the four years' extra life which the road anticipated for the 292 ties, the MTA already has obtained eight years' extended life, and the ties and pads are still in use. Since plate cutting has been arrested, these ties and pads are still in good condition and by next year, the road will have doubled the normal service life of the ties. With an expenditure of approximately \$1,200 for adzing the 292 ties and installing tie pads on them, an expenditure of about \$9,016 for tie renewals was eliminated.

Since 1949, the MTA has made it a standard practice to apply tie pads on all ties on curved track of the elevated structure. The pads are 7- $\frac{3}{4}$ in by 12 in in size for the outer rails, and 7- $\frac{3}{4}$ in by 24- $\frac{1}{2}$ in for the inner rails, where restraining rails are used. This practice already is paying off in reduced tie renewals. For the five years prior to 1947, when the road first began using tie pads, the average number of ties renewed on the elevated structure was 4,071 per year. In contrast, the average number of ties renewed annually for the five years 1951 to 1955, inclusive, amounted to 2,438. This represents an average reduction of 1,633 ties per year. Forty per cent of these 2,438 ties were on

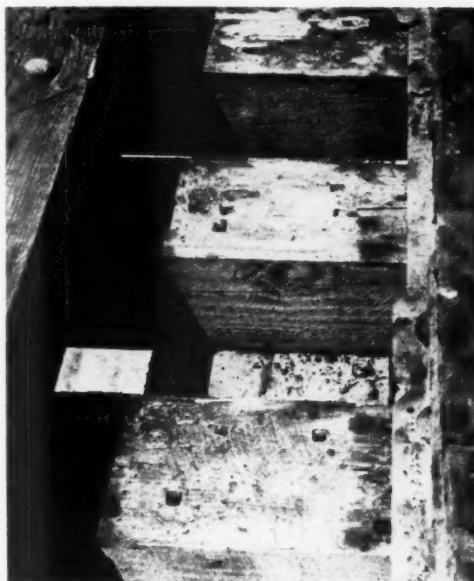
Itemized Cost of a Bridge Tie on the MTA Based on 1948 Prices

MATERIAL:	
Bridge Tie	\$12.81
Guard Timbers	2.22
Fittings: Lags, bolts, cup washers, insulators, etc.	2.37
Total for material	\$17.40
LABOR:	
Engineering cost	\$.73
Measuring in field and fabricating at mill	1.51
Unfastening ties and timber preparatory to removing by day crew	1.34
Removing guard timbers by night crew	1.18
Renewal of ties by night crew	3.84
Permanent fastening of ties by day crew	2.04
Installing guard timbers by night crew	1.18
Permanent fastening of guard timbers by day crew	1.26
Loading of new ties, guard timbers and material on work train, removal of old ties and guard timbers from work train, and work-train expense.	.39
Total labor	\$13.47
Total material and labor per tie	\$30.87

... Contrasting sharply with timbers that now have the benefit of tie-pad protection



TIES WERE ADZED and wood was found to be sound. Tie pads and longer plates were applied. Here they are after six months' service.



AFTER years of service, self-sealing pads were removed from ties installed new. Wood still looks new.

curves with the remaining 60 per cent on tangents. At a cost of \$38 per tie in place, this represents a saving of over \$37,000 for the ties on curves.

Because there was a movement on foot to tear down the elevated structure, the road did not extend the policy of applying tie pads to tangent track. However, since it is now anticipated that the elevated structure will remain in place for a considerable time in the future, it was decided in 1956 to extend the use of tie pads to tangent ties, and still greater savings in tie renewals are foreseen.

Other Renewals are Costly

Renewing crossties on the ballasted track on reservations and in the subways also presents a problem to the MTA. Unlike ties for the elevated structure, which are loaded directly onto cars at the timber-storage yard, the ties for the ballasted track and subways must be loaded onto trucks, hauled cross-town to a freight yard, and then loaded onto cars.

This requires a truck driver, a foreman, and four men for handling 150 crossties.

Because night is practically the only time the tracks can be used by the maintenance forces, a foreman and four men, plus a motorman and a train guard, unload the ties at night, placing them beside the track at the exact location where ties are to be renewed.

Only about 25 ties can be installed and temporarily surfaced each short working night by a foreman and 10 trackmen, thus requiring six nights to install 150 crossties. Three nights more are required by the same crew to surface these ties. The old ties are then picked up by a foreman and four men plus a train crew, and loaded onto cars, after which the old ties are transferred to a truck and hauled to a disposal area. There, a laborer handles the burning of the old ties.

Because of this necessary procedure, and even though the treated pine ties cost the MTA about \$5.50 each at the timber-storage yard, it costs in the neighborhood of \$18 for each tie renewed. To cut down this cost by extending the life of the ties, the MTA is now applying tie pads on all crossties renewed on these tracks. The MTA feels that the cost of surfacing long stretches of new ties on ballasted track should be included in tie-renewal cost.

Although the ties in the subway tracks have a long service life, the road believes that tie pads are justified even in this location as the abrasion from brake grindings, sand drippings, and the little moisture that is present accelerates plate cutting.

In 1952, after 38 years of service, the ties in the Boylston Street subway were carefully examined. After adzing, the wood was found to be sound. Tie pads were applied and the MTA believes that these

ties are now set for another long life cycle.

Another interesting aspect in the road's use of tie pads is that it has permitted a reduction in the labor force. Though the mileage was increased 18 per cent in 1952 by the construction of ballasted track between Maverick Station and Orient Heights, and later to Wonderland Station, the road has been able to maintain its tracks with 22 per cent less labor. This reduction is attributed largely to the longer life which the road is obtaining from its crossties.

Although experience has shown the road that tie pads may double the service life of most ties, some are removed from the tracks for reasons other than plate cutting. However, all new ties are now installed with tie pads. Whenever a new tie leaves the timber-storage yard, it is accompanied by two new tie plates to which tie pads have been applied. The MTA uses an adhesive to combine the tie plate and the tie pad. This combination saves valuable and extremely short working hours during the night when installation must be made.

The second major cause of tie removals is weathering and splitting, and Mr. Myott is using tie coatings applied to the top of the ties to seal the ties from the weather. By using the larger tie plates, heavy restraining rail-tie plate assemblies, tie pads and sealing coats, he is confident that he will then be able to double the service life of all ties.

Our Changing Track Forces

Organizations put into effect on three roads are described by panelists at Roadmasters' convention. The "why" of the revisions is also explained.

In an effort to solve the problems created by rising costs—and also to make the most effective use of the many new types of machines now available—many roads have revamped their basic track-maintenance organizations. Three roads that have given particular attention to this matter are the Central of Georgia, the Chesapeake

& Ohio and the Frisco. During a panel discussion on "Trends in M/W Organizations" at the Roadmasters' convention in September a representative of each of these roads told how the track forces on his road had been reorganized, and explained the reasoning behind the changes. Their comments are reproduced here.

CHESAPEAKE & OHIO HAS . . .

- Section and extra-gang setup on some lines
- Section gangs only on certain territories
- Patrol units only on light-traffic branches

Mr. Kellogg—On the Chesapeake & Ohio our tracks extend from Newport News, Va., to Chicago and from the Ohio river through Michigan up into the northern portion of the state. We have single-track main lines carrying 50,000,000 gross tons per year. We have multiple-track, high-speed, heavy-traffic lines. We have secondary lines and we have branch lines with trains that operate once or twice a week. We also traverse the mountainous country of the East and the level and rolling country of the Middle-west and in many places we are subject to heavy snowfall in the winter months.

It is easy to see, therefore, that one type of maintenance-of-way organization could not be adapted for the entire system.

For this reason, we have several general types of organization:

(A) On our multiple-track main lines our sections average in length between 10 and 20 miles of road or 20 to 40 miles of main track. The section gangs on these lines each consist of a foreman and 4 to 6 men. The out-of-face maintenance work is done by extra forces consisting of a foreman, an assistant foreman and 25 to 35 laborers. These men do all of the out-of-face work, including tie installations. We usually have one such force on each supervisor's district. Production tampers are employed for the surfacing operation.

(B) On our single-track, high-speed main lines with medium traffic, we have sections that are 36 to 40 miles long. The typical section gang here consists of a first-grade foreman, a second-grade foreman and 18 to 22 laborers. There are no extra forces employed for maintenance work on these sections; the regular section forces do all of the work, including out-of-face surfacing and tie installations. The out-of-face surfacing is done with production tampers which are scheduled throughout the season for use on the various sections.

We have several reasons for this type of organization:

(1) We eliminate the use of camp cars. The men are home every night. Most of these men, we have found, would not move into camp cars and live away from their headquarters.

(2) We have an ample supply of men available during snow storms as we retain the same force the year around.

(3) During the winter the men are kept busy cutting brush, tightening bolts, and (when the weather permits) doing yard work.

This type of organization reduces the number of section headquarters required. These forces are equipped with a 1½-ton motor truck, regular section motor car and a small inspection motor car.

(C) On our secondary lines in the North we have sections which are 20 miles in length. On each section we have a foreman and 6

laborers. There are no extra forces on these lines, all work being performed by the section forces. In fact, it has been a good many years since we have had an extra force in this area. The section men go to and from work on motor cars due to the fact that in most places the highways are not adjacent to the railway. At certain key points, however, we do have 1½-ton trucks which are used for transporting men and materials as required.

(D) On our light-traffic branch lines, it has been our policy to lay them with 131-lb or 112-lb rail, renew all ties where necessary and ballast them with good washed gravel or crushed limestone ballast. We then eliminate the section forces completely with the exception of a patrol force consisting of a foreman and 2 men who cover approximately 60 miles of railroad. Before we rehabilitated these lines, we had a foreman and two men for approximately 10 miles of railroad. On these branches, we use weed-killer and brush spray as needed and we operate an on-track mower along the lines to cut the weeds along the embankment shoulder.

Tie Renewals Ahead of Surfacing

We are now in the process of making a change in our surfacing operations. That is, we have adopted the practice of installing our ties independently and ahead of surfacing work. On the lines where we have no extra forces, this work is done by section forces previous to the time that they receive the production tampers. On the lines where we have extra forces, this work is done with a tie force consisting of approximately 25 laborers.



MODERATOR for the panel discussion was E. L. Anderson (at rostrum), chief engineer, Frisco. Waiting their turn to speak are (l. to r.): H. W. Kellogg, assistant chief engineer, maintenance and construction, C&O; W. E. Chapman, superintendent maintenance, C of Ga; and W. A. Schubert, division engineer, Frisco.

The surfacing force follows behind the tie-installing force after a day or so. The surfacing force is comprised from 18 to 20 laborers, using two production tampers in tandem, a ballast regulator and a power track liner. We are now able to complete approximately 3,000 ft of track per day.

This system was started two years

ago, and in 1957 we plan to continue extending it to the other divisions. In the past, as I stated before, we usually had extra forces located on each supervisor's territory. In the new setup a tie force and a surfacing force working in conjunction with each other, operate over at least two supervisors' districts.

CENTRAL OF GEORGIA USES . . .

- **Nucleus of mechanized tie and surfacing gangs**
- **Supported by flexible gangs for interim work**
- **Track inspection by supervisor or assistant**

Mr. Chapman—The track force organization on the Central of Georgia is centered around a nucleus of fully mechanized timbering and surfacing gangs. These gangs will timber and surface all main track, passing tracks and yard tracks every four to five years and will put them in such condition that they will require only spot smoothing during the intervening time until the next working. There will be three of these gangs all of which will be housed in conventional camp cars. They are so equipped and set up that they can work from one-half mile to 6000 ft of track daily.

Ahead of each of these gangs our tie-unloading machine* unloads ties exactly where needed, using one machine operator, one supervisor and one laborer.

Supporting these out-of-face gangs, and carrying on what we know as housekeeping maintenance during the interim between surfac-

ings, are flexible maintenance gangs. These units are housed in highway camp cars (trailers) and each gang is provided with a heavy-duty truck for moving the trailers and gang, and also a motor car. Each gang will be comprised of one foreman, eight laborers and one cook. There are three trailers to each outfit—one for the foreman, a bunk trailer for the laborers, and a combination cooking, dining and recreational trailer. There will be 14 of these gangs.

One of these flexible gangs on each division is assigned to the work of unloading ballast ahead of the timbering and surfacing gangs and picking up the old ties behind them.

Each supervisor's district, a distance of 75 to 200 miles, depending on traffic, will have a supervisor and an assistant supervisor and each will have a laborer who will move over the district with them. These laborers will do any small jobs that are found to be needed as they go over the track.

The assistant supervisor must inspect his entire district every two days, and the supervisor also inspects track on such days as he is available for such work. Each supervisor and assistant supervisor carries with him such tools as the laborer will need for the small corrective jobs.

Also Has "Yardmen"

In addition to the force mentioned above, laborers, commonly called "yardmen," are assigned to strategic points, where daily attention is needed for switches, gagging and similar duties. The number of yardmen for each location is determined by the mileage in yards, the number of switches and grade crossings, the amount of traffic and other needs.

The small flexible gangs take care of the smaller details of maintenance without a great loss of time while traveling to and from the work to be done, as these units can be and are camped at or near the site of the work to be done. Often, the men have only to walk out of their trailers to get to the job.

The work of these gangs is lined up by the supervisor and assistant supervisor, after consultation, on a weekly basis. The work for a week is so planned that the camp cars will not have to be moved during the week except in cases of emergencies.

Our gangs work four nine-hour days and one four-hour day each week. When the decision has been made as to where each gang will work the following week, it is so notified, and at the end of the four-hour day on Friday, the movement of the camp train begins.

The flexible gangs are division gangs and are worked where needed on the division as determined by the division engineer. All can be worked on a single supervisor's district, or none at all, or in any combination. This is particularly important when assembling large or small forces in emergencies.

Rail Laying and Construction

The laying of rail is performed by a rail gang, fully equipped and housed in conventional camp cars, which is abolished when the rail-laying program is completed. However, where practicable, rail laying is scheduled as an all-year job. All construction work is performed by another extra gang, housed in conventional camp cars, which is also

*The tie-unloading machine, as used on the Central of Georgia, was described in the August 1956 issue of RT&S.

abolished if there is no construction work to be done. Rail laying and construction work may be done by one gang, if the work can be properly scheduled, and if neither the rail nor the construction program is too large.

In our organization section gangs are eliminated. This organization has increased efficiency and pro-

duced economy in our maintenance work, by reducing the unit cost of all types of maintenance jobs, and by giving us a better all-around grade of track. Estimated savings are better than 40 per cent per year on the investment, and our experience so far indicates that the savings will be considerably in excess of this figure.

equipped with both trucks and motor cars to give them proper transportation for economic use.

How Work Is Scheduled

Our mechanized gangs are housed in tourist sleeper cars newly rebuilt for this purpose. They are well equipped and their work is scheduled so as to eliminate all possible loss of working hours due to inclement weather. This means that they work on the southern territories during the winter and the northern territories in the summer months. Their work is programmed so they will take care of tie insertions and surfacing on rail program locations, as well as the "cycle" locations where rail programs are not scheduled.

The actual laying of rail on our annual program will, as in the past, be handled by our system rail-laying gang.

Of the five mechanized gangs, only the gang first established on my territory is equipped with tie-extracting and inserting machines, while the other four gangs do not have them. We are studying the results of the two types to determine the economy and efficiency of their operation, and the results will be the deciding factor in determining whether all gangs should be equipped with the tie machines.

Future Possibilities

The future indicates many possibilities for more changes, particularly since we are again faced with additional increases in prices of materials and wages. Our studies should include the working agreements with labor organizations, stability of employment, climatic conditions, the increasing development of communications for gang operation, development of still better work equipment, and the changing attitude of management on many railroads towards maintenance-of-way problems.

Our track supervisors, by careful planning and proper coordination with all crafts, will step up rapidly the handling of their work, reorganizing their gangs to meet the needs of improved equipment and materials at their disposal. The old-type supervisor or roadmaster who handled his work from the back of a passing train by the old "butterfly" system has no place in this picture, since it takes personal contact in all phases of work and careful planning for him to do his part in achieving good maintenance under today's conditions.

FRISCO RELIES ON . . .

- Mechanized gangs for tie and surfacing jobs
- Floating district gangs for other heavy work
- Small patrol units for emergency and odd jobs

Mr. Schubert—Our reorganization of track gangs started in 1947. We reduced the number of section gangs and extended the territories of the remaining gangs. District gangs were established to perform the heavier operations and out-of-face work formerly done by doubling up sections, which necessitated running them at times a great distance, thereby losing valuable work time and arriving at the location of the work with a surplus of supervision.

First Mechanized Gang

From time to time it became necessary to make changes in our organization to take advantage of the modern work equipment made available to us. In August 1955, we established on my territory our first fully mechanized gang for tie insertions and surfacing track out-of-face. This gang consists of 1 spike puller, 2 tie extracting and inserting machines, 1 nipper-spiker, 1 jack cart, 2 production tampers, 2 track patrols, 1 lining machine, and 1 track broom. This gang has 1 foreman, 2 assistant foremen, 10 machine operators and 23 laborers.

It was noticeable from the beginning that we were making progress with this mechanized gang far beyond expectations as compared to the old setup of section gangs. After additional thorough studies and tests, drastic changes again were made in our organization in January of this year when four additional mechanized gangs were established, set up in accordance with a program whereby gangs will be moved on a "cycle" basis. Not only our main track, but also secondary main track will be improved and given necessary attention.

In line with this planned pro-

gram, we now have an organization doing this type of work on our 6700 miles of main track and sidings and back tracks, consisting of:

136 so-called section gangs
47 district gangs
5 mechanized gangs
213 foremen of all classes
996 men in the gangs

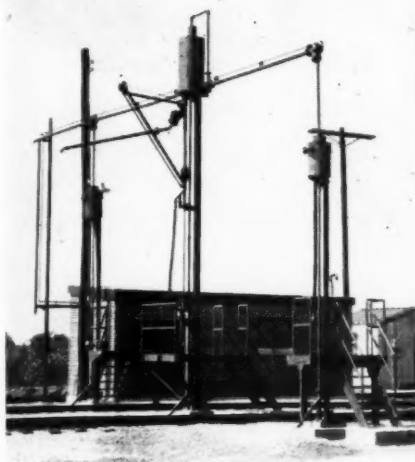
In addition, we have planned the program of tie renewals and surfacing work in connection with our rail program so that it can be done by these mechanized gangs. This work in the past has been handled by seasonal extra gangs.

When establishing the mechanized gangs, we reduced the number of district gangs and removed the patrol unit formerly consisting of the assistant district gang foremen and two men, which was used to patrol track and perform emergency and odd jobs, and substituted for it a foreman and two men with no increase in pay. The so-called section gangs are patrolling units that inspect switches, take care of emergency work and odd jobs that usually have to be done by small gangs.

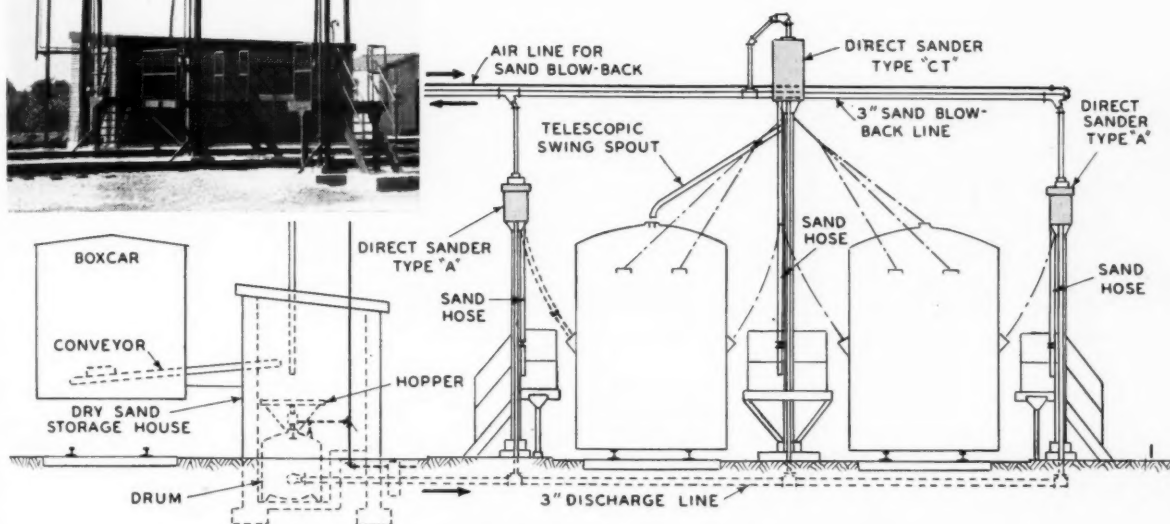
The floating district gang on the roadmaster's territory handles the heavier work, such as lining and surfacing curves, and work not on the schedule of the mechanized gang. The district gangs also take care of larger repairs to back tracks, the building of industry tracks and other jobs of similar nature. On two territories on my division, these floating gangs are housed in outfit cars. On the other two territories, they operate as "bucket" gangs, working out of a central point for such period of time as there is work in that vicinity, then moving to another central location on the roadmaster's territory.

All floating district gangs are

Direct Sanding for Diesels . . .



. . . Is the system preferred on the Burlington. Sand is delivered to locomotives by gravity from small pots on towers which are filled automatically by air pressure



SANDING installation on the Burlington at West Quincy, Mo., has two types of direct sanding "pots."

Large overhead storage tanks for diesel locomotive sand are eliminated in a type of sanding arrangement that has been installed at several locations on the Burlington. In the system used, developed by the T. W. Snow Construction Company, the sand is delivered by air pressure to small pots on towers from which it flows by gravity through hoses into the sand boxes of the locomotives.

With this system the working area at the servicing platform is less congested, minimizing the possibility of safety hazards. Also, the lightweight pots, with a capacity of about $\frac{1}{2}$ cu yd of sand, eliminate the need for the heavy reinforced concrete footings that are required when overhead storage tanks of 10 and 50 tons capacity are installed.

When the Burlington moved its depot, shops and diesel servicing facilities from Quincy, Ill., to West Quincy, Mo., just across the Mississippi river, it had the problem of deciding what type of sanding equipment to install. It was de-

By **W. D. Gibson**

**Water Service Engineer (Retired)
Chicago, Burlington & Quincy**

cided that the most economical procedure, from the standpoint of original cost and operation, was to install a direct sanding system similar to a previous installation at the Aurora (Ill.) shops.

Pre-dried sand is unloaded into a masonry sand storage building. The sand, which is received in company service box cars, is handled from car to storage or direct to the elevating drum with a light portable conveyor.

A hostler or laborer, to sand a locomotive, opens the valve at the discharge end of the sand delivery hose. This action permits sand to flow by gravity from the small overhead pot. As soon as this flow starts the supply in the pot is replaced automatically from the drum within the sand-storage house. Although, the sand is delivered from the storage house to the pots with approximately 40 psi air pressure,

sand falls by gravity from the hose. A baffle system and dust-tight moveable fittings remove any possibility of permitting the sand to be "blasted" from the hose outlet and causing injury to the operating personnel.

The two outboard Type "A" direct sanders service the side and end pockets of the road units and some of the switchers, as does the hose on the inboard type "CT" direct sander. The "CT" sander, with a telescopic, swing spout, is utilized for either track when overhead sanding is required.

The drum in the sand storage house may be filled at the convenience of the operating personnel, the frequency of such filling obviously being dependent upon the number of locomotives sanded since the last filling which, in turn, is governed to a considerable extent by climatic conditions. After the drum has been filled the automatic air valve to the tank is opened and locomotives on both tracks may be sanded simultaneously.

For Use in Tunnels . . .



AFTER receiving a finish coat of paint, the rail is loaded directly onto flat cars for shipment to the site of installation.

Why They Are Painted

A number of years ago the Norfolk & Western became concerned over the increase in the number of head-and-web separations occurring in rail laid in paved road crossings and tunnels. Stress measurements had shown that 131-lb RE rail develops high tensile stresses in the web near its juncture with the head. These stresses were attributed to eccentric vertical loads. Under ordinary conditions they were not sufficient to cause cracks to appear. It was concluded, however, that where corrosion was present the stress concentrations could eventually result in fatigue cracks. Thus, it was reasoned that the corrosive conditions present in paved road crossings and tunnels were an important contributing factor in causing the head-and-web separations. To prevent the corrosion of rails at these locations, the road started the practice of flame-cleaning and oiling such rails before installation. At that time, it was estimated that rails treated in this manner would have a service life at least 25 per cent longer than if they were installed untreated.

How Long Rails Were Painted

The Norfolk & Western is trying out a new procedure to protect continuous welded rails laid in tunnels from the corrosive effects of moisture. The rails are now painted instead of oiled as formerly, and an interesting procedure has been devised to integrate the painting operation into the welding production line. This description of the procedure is based on an article that appeared originally in the road's employee magazine.

● How to apply two coats of paint to long rails as they are welded was a problem recently encountered—and solved—on the Norfolk & Western. Some years ago the road, as a protective measure against corrosion, started the practice of flame-cleaning and oiling long welded rails intended for installation in tunnels. When it was decided recently to substitute two coats of paint for the oil it was apparent that a new problem in application had been created.

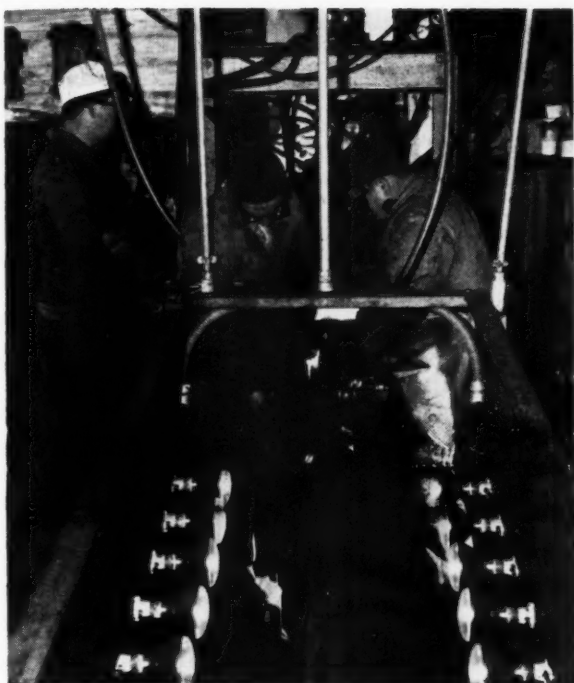
To eliminate additional handling of the welded rails to be painted,

it was desired to apply the paint in conjunction with the welding operation. The assembly line for producing continuous-welded rail by the Oxweld pressure-welding method is located at the road's roadway material yard in Roanoke, Va. The logical procedure was to apply the paint to the rails as they come from the welding production line. But to allow the paint to dry in the normal manner would cause excessive delays to the welding process. However, by heating the rail with infrared lamps the drying of the paint was speeded up suf-

ficiently to permit the painting operation to be synchronized with the normal movement of the production line.

After the welds are finish ground, the rail moves along a roller line into a flame cleaner for removal of the mill scale. It then undergoes a wire brushing before passing into the first heating tunnel which is lined with the infrared lamps. As it leaves this tunnel, the rail moves through a small shelter where a painter on each side, equipped with a spray gun, gives it a primer coat. From this shelter the rail enters another warming tunnel, also lined with infrared lamps. It then moves into another shelter where the finish coat is applied. Use of the infrared lamps makes it possible to apply the finish coat 15 min after the primer coat is applied.

Two different types of primer and finish paints were used. Three-quarters of the total footage of rail painted was given one coat of zinc yellow primer and one coat of box



DRYING of the paint was materially speeded up through the use of infrared heat lamps.



PAINT is heated thus eliminating the need for thinning. Two painters with spray guns painted rails at production line speed.

car brown paint. The remainder of the rail was painted with one coat of Neoprene primer and a finish coat of Neoprene paint.

Paint Is Heated Too

The operation features another time-saving innovation. Under normal conditions the paint would have to be thinned before spraying and would necessitate a second coat for sufficient coverage. Heating the paint, however, thins it sufficiently for use in the spray guns and in effect allows a double coat to be applied as one.

After the completion of the painting process the rail moves on rollers through a drop-end gondola car and onto a string of flat cars. It is then shipped to the site of installation.

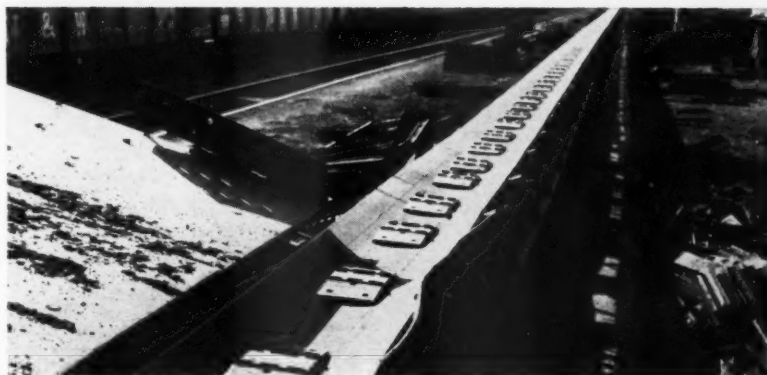
Tie plates, after a thorough cleaning with wire brushes, are placed on a roller rack and sprayed as they pass a painter. They then move from the rollers onto a conveyor belt which allows them to dry as they move toward the other end. After the plates have traveled a sufficient distance for drying they are removed and stacked.

Painted rail has been laid in the road's Elkhorn Tunnel and Cooper Tunnel. It will be under continual observation to determine the effectiveness of the paint.

Tie Plates Are Painted Too . . .



CLEANED PLATES are placed on roller rack and sprayed as they pass a painter. They then move from the rollers onto a . . .



. . . CONVEYOR BELT on which they dry. At the end of the conveyor, the dry plates are removed and stacked for shipment.



DUST PROBLEM at the B&O's large coal pier at Curtis Bay (Baltimore), Md., has been solved by the installation of a wetting system engineered by Johnson-March Corp. As cars are dumped the coal is sprayed with a special surface-active agent which is discharged from nozzles that operate automatically. An adjacent ore pier has been similarly equipped.

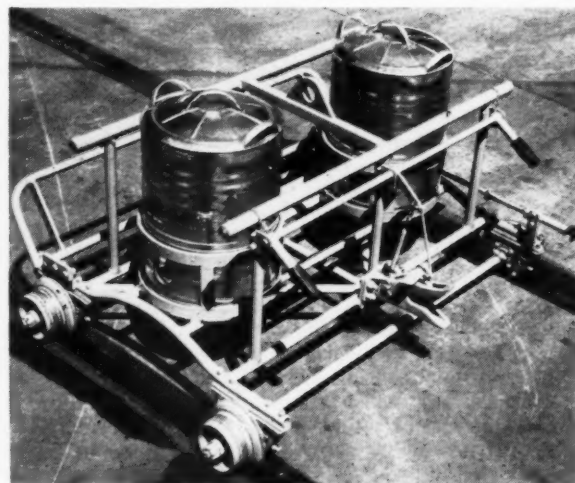
A **DRAMATIC** test in the high voltage laboratory of Westinghouse Electric Corporation demonstrates the safety provided by steel buildings against lightning. Surges of artificial lightning (2,800,000 volts and 1600 amps) were discharged to an Armco steel building from a terminal suspended from the laboratory ceiling. The building was suitably grounded. The man in the building was not hurt in any way.



News Briefs in Pictures . . .



THE FRISCO has developed two devices designed for use with track-maintenance gangs. One (left) is an arrangement, used with Multiple tampers, for cleaning chat from between tie plates and the base of rail. Compressed air, discharged from two "hand spray brooms" does the job. Air is furnished by 12-cfm compressor driven by tamper power plant. The other device (below) is a drinking water car—capacity 20 gal—that is moved forward in a surfacing gang by the jack carrier. Water car is moved forward when the jack carrier is making its return trip from the tamper. Formerly the water supply was carried on the jack carrier, causing delays to that unit.



"WEED AND BRUSH KILLER ARE IN OUR BUDGET FOR 1957—

WE WANT TWO THINGS—

THE BEST POSSIBLE KILL FOR THE MONEY WE SPEND

THE LOWEST POSSIBLE COST PER MILE PER YEAR"

"OK, MR. CHIEF ENGINEER, we can give you both.

You say that you know but little about chemical. Such being the case, we will try and provide for your use the fund of information that you need to go into the subject intelligently.

You know of course that there is no one weed killer or brush killer that is a cure-all for all time. Weed killer should be regarded as an investment which needs to be followed up to pay off.

The railroads that have the clean right-of-way are the ones that have gone along with the use of chemical from year to year, slowly but surely building up a condition where prevention becomes as important as cure. In other words, with a clean ballasted area and only incidental growth, treatment has been continued to make sure that the old, heavy growth may not be permitted to return.

A program entrusted to us justifies something more than just spraying and collecting. We like to study the problem of each railroad year after year and provide guidance as to what type of chemical and what quantity of chemical is to be used from year to year.

This service and interest pays off for both parties to the contract."

**WITH BUDGETS IN THE MAKING, WE WOULD LIKE TO REVIEW YOUR
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WHAT'S THE ANSWER?...

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Cycle Tie Renewals—When?

Where the "cycle" method of making tie renewals is used, what factors determine the length of the cycle? Explain.

Several Factors Determine

By J. H. BROWN
Division Engineer, St. Louis-San
Francisco, Ft. Worth, Tex.

There are several factors which, accorded their proper value, are used to determine a proper tie-renewal cycle. They are: Present physical condition of ties; general track and ballast conditions; expected tie life resulting from improved treating methods; traffic density and speed; drainage; and climatic conditions.

Since all of the elements of the tie-renewal cycle equation are variables and since now we must also consider additional factors that relate to improved methods and equipment, the scope of determining a proper cycle period is realized to be a difficult problem to solve—prior to any experience under a specific set of conditions. Therefore, assuming that the specialized-gang-type tie-renewal program is being initially planned for a given railroad system, it necessarily becomes the task of general maintenance officers to predetermine a suitable tie-renewal cycle, prior to actual experience or the scheduling of any type of overall program. They, of course, consider the general conditions on their property plus anticipated production rates, and other specific factors. These considerations coupled with specific over-all goals enable them to establish a desired cycle period.

At this point the execution of the program falls into the hands of division supervisory personnel who, with a general cycle period set forth by higher management, must determine to a more exact point the prevailing tie conditions on their territories. To do this effectively, the first requirement must be the compilation of as complete information as is available of past tie

insertion dates and locations. This data can usually be obtained from records as well as from personal contact with field supervisory forces. With this information in hand, a chart is made with horizontal headings indicating mile-post locations and vertical columns denoting years. The latter should include the last five years to record the history of tie insertions, and the following years up to the number of years of the cycle. This chart will then readily indicate the "strong" and "weak" places. With this information and yearly tie allowances, division and sub-division level supervision can map out a program to complete tie insertions through the given cycle period.

With a tentative program in mind, supervisory officers must go to the field and walk the track, marking ties to be removed. During this process of tie-spotting it is necessary to keep in mind the length of time which will intervene before the next cycle. This requires

close attention to overall tie conditions in each panel of track in order that a sufficient number of ties are inserted regularly to maintain a rigid structure.

After marking ties, and after one year's program has been completed, the proper information should be plotted on the chart, and the same process performed for succeeding years.

By the above method, and by periodic visual inspection of riding and physical track conditions, it becomes readily apparent whether or not the overall cycle as originally set up actually fits individual locations. With this additional insight a more adequate cycle can be determined for the future at different points—probably lengthening the cycle time at some points and shortening it at others. Thus there will be obtained the desired results of efficient and economic tie insertion, with as little "in-between-cycle" spotting as possible. The above plan is very necessary in order to keep abreast of our accomplishments in the light of costs and results and help to give us an insight into other techniques when they avail themselves to us.

Since change is our most promising factor for the future, we must become better equipped to weigh

Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, Railway Track and Structures, 79 W. Monroe St., Chicago 3, and reach him at least five (5) weeks in advance of the publication date (the first of the month) of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered in the January Issue

1. How many years of service life should remain in those ties which are removed from track in a "cycled" tie-renewal program and reused in secondary tracks? What effect does the length of the tie-renewal cycle have upon the percentage of reusable ties? Explain.

2. To what extent are commercial fire extinguishers useful in putting out fires on timber trestles? What types are most effective? Where should they be kept when not in use?

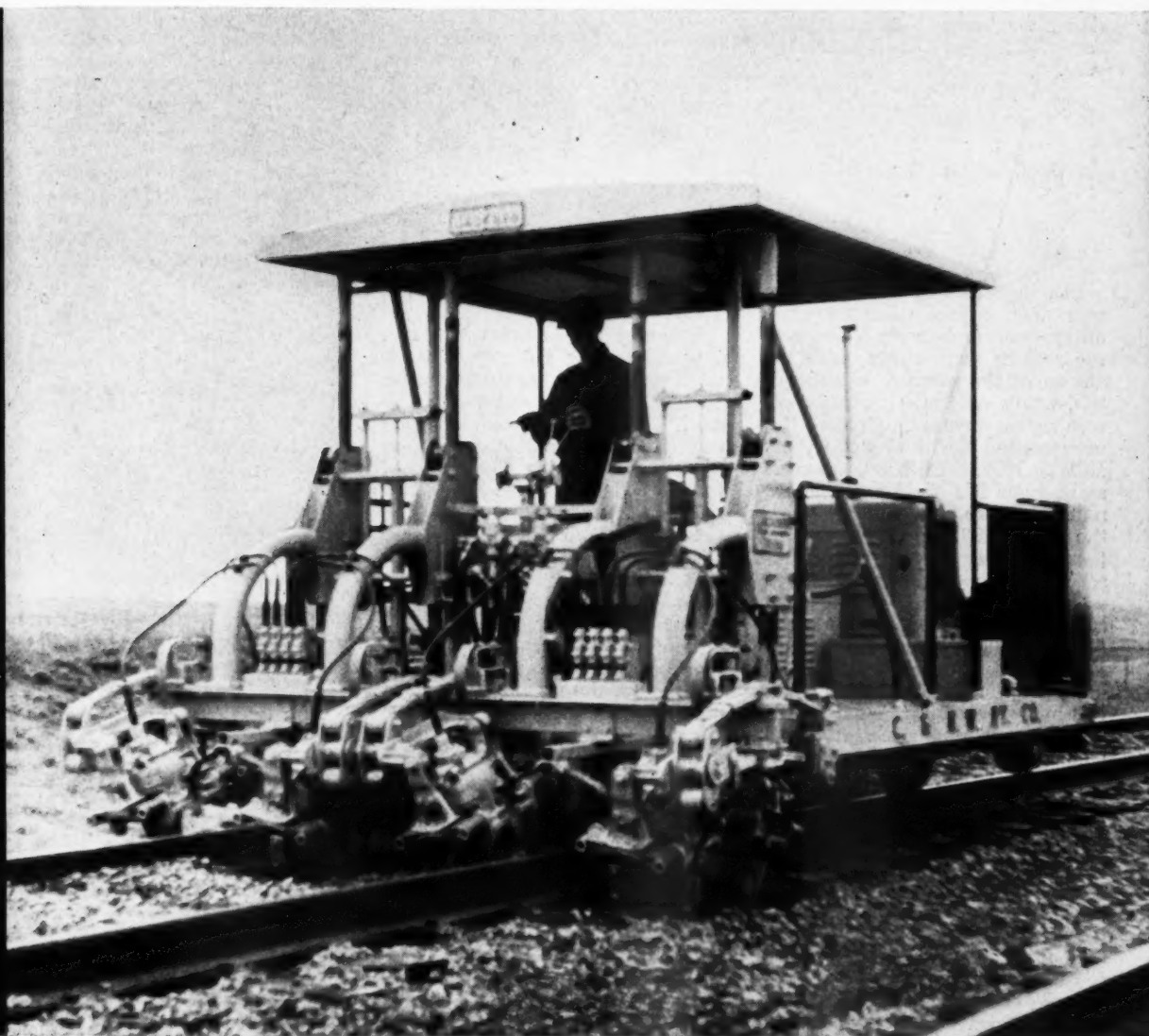
3. Is the use of aluminum gutters and downspouts justified on railway buildings in spite of their higher initial cost? Why? Explain.

4. What factors determine the type of roadbed stabilization—grouting, pole driving, subsurface drainage, etc.—that will be most effective and economical at a particular location? Explain.

5. What is the most practical method for chlorinating small supplies of water such as from wells and cisterns which serve section houses, etc? Explain.

When you recommend

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Your good judgment is confirmed by that large majority of railway officials who, during the past year, bought JACKSONS in preference to all other on-track tie-tamping equipment.

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Nothing, we believe, could more clearly indicate the very definite superiority of this machine as a medium for both putting up and maintaining track of uniformly finest quality. By all means, let us give you the down-to-earth facts before you make any recommendations or commitments.

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What's the Answer (Cont'd)

past methods against proposed methods in order that we might determine new ideas, and readily accept them as they come each year.

Tie Condition Determines

By H. F. REILLY

Engineer Maintenance of Way,
Lehigh Valley, Bethlehem, Pa.

In many cases tie conditions are such that a predetermined cycle on renewals is difficult. A check of the records reveals that, with the advent of the pressure treating of ties, many railroads made out-of-face replacements of untreated ties with treated ties during the years 1910 to 1916. With a normal average service life of 24 years, entire renewals were again due between the years 1934 to 1940. During these depression years, some railroads were not financially able to make such renewals, with the result that wholesale tie renewals had to be made during the 1940 to 1950 period. Except where TC and other inferior type ties were used, tie renewals on railroads so affected will not again be necessary until wholesale replacements are required. In order to establish the cycle method in these cases, some ties would be removed before their full service life. Because of present labor costs, the economic benefits of such a practice would be questionable if unwarranted tie replacements were made solely for the sake of establishing a cycle method of tie renewals.

If tie conditions were ideal for the cycle method of making tie renewals, the replacement of six ties per rail on a six-year cycle would be a good answer to this question; or, if speed, tonnage, type and species of ties warrant a service life of more than 24 years, the cycle could either be increased or the number of tie renewals per cycle reduced accordingly.

If a cycle for the renewal of ties is adopted, the condition rather than the age of the ties should be the determining factor on the number of ties to be renewed on each cycle.

When a track with favorable ballast conditions is in need of surfacing and tie renewal requirements are less than three per 39-ft rail length, it is more economical

to surface and line the track and postpone tie renewals until such a time when there will be a greater number of ties requiring renewal.

This answer is presented on the premise that mainline ties are renewed in conjunction with out-of-face track raising, and does not include factors that might be involved if tie renewals are made independent of track raising.

Age of Ties Not a Factor

By B. BLOWERS

Chief Engineer, Erie, Cleveland, Ohio

The way the question is stated, it would appear that a cycle method is used in making the renewals. Such is not the case on our railroad. The number of ties renewed each year is dependent entirely on the actual condition of the ties in track as determined by field inspection regardless of age of the tie. Some of our older ties appear in better condition than ties installed within the past 8 to 10 years.

However, assuming that the question refers to the cycle method of out-of-face track work where tie renewals are more or less incidental thereto, the factors that determine the length of time that the track has to be worked over again, are:

(a) Subgrade conditions. Since the supporting foundation of the track structure varies with the geology, so does the length of time the track, or portions thereof, remain stable. A few locations, where the subgrade is soft and where the adjacent earth is marshy, will require out-of-face work within two or three years. Some locations, where the subgrade and/or adjacent earth are of unstable materials such as viscous clays—troublesome when wet—or of granular materials such as slag, require frequent cycles of work. At other locations where the subgrade is of a more stable nature, the cycle can be lengthened. Subgrade condition is perhaps the number one determining factor in spacing the cycles of out-of-face work.

(b) Traffic conditions where considerable tonnage is carried will require more frequent cycles of work.

(c) Heavy grades and curves of substantial degree demand more frequent out-of-face work with attendant tie-renewal requirements.

(d) Rail and joint conditions determine to a large extent the per-

missible intervals of time between track-work operations. We have found that this length of time can be increased considerably by the use of rail-grinding outfits where the entire length of rail is ground slightly to provide a smooth surface whereby vibration of track structure by rolling stock is reduced.

(e) Speed of trains. This has a decided effect on length of cycle.

From the foregoing, it is apparent that local conditions determine the cycle length and that judgment of the supervisor is necessary in recommending and limiting this cycle to meet safe and economic conditions.

Favors Seven-Year Cycle

By R. F. BUSH

Engineer Maintenance of Way,
Delaware, Lackawanna & Western,
Scranton, Pa.

Where the "cycle" method of making tie renewals is used, the primary consideration is that all ties per mile of track must be renewed in the number of years equal to the average tie life.

If the tie life is assumed to be 30 years for ties in main track averaging 3,240 ties per mile, then a cycle of five years could be set up renewing an average of 540 ties per mile every fifth year or a seven-year cycle renewing an average of 755 ties per mile every seventh year.

Generally the tie renewals will be made in conjunction with a track raise of from 1½ in to 3 in.

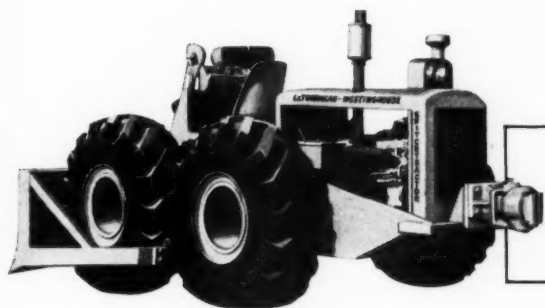
The decision, whether to establish a five or seven-year cycle for tie renewals or a more frequent cycle, is dependent on the following factors: (1) The cycle for out-of-face surfacing; (2) the size of the track gang to be used; (3) whether tie renewals are to be made under traffic or with track out of service; and (4) if tie renewals are made in conjunction with a 2½-in or 3-in raise and the cost of ballast and work trains for cycles of four or five years as compared with a seven-year cycle.

On the Lackawanna we have set up a seven-year cycle. The number of ties to be replaced is determined by an on-the-ground tie inspection. The ties are renewed the first year of the cycle under "detour" with an out-of-face 3-in track raise and surfacing.

The cycle on the Lackawanna
(Continued on page 52)

**NEW
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SwitchTractor**

Famous high-speed work-and-run tractor now available with standard railroad couplers. Railroad draw-bar attachment now makes this famous high-speed tractor even more versatile, gives you the plus value of a go-anywhere off-track switcher for car-spotting work.



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A Subsidiary of Westinghouse Air Brake Company



An aerial, high-contrast black and white photograph of a large railway yard. The image shows a dense network of tracks, switches, and sidings, creating a complex geometric pattern. The perspective is from directly above, looking down on the tracks. The lighting creates strong shadows, emphasizing the three-dimensional structure of the rails and the layout of the yard. The overall tone is industrial and technical.

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The two-rail, 49° angle crossings shown are located in Central Ohio where three tracks of the Pennsylvania Railroad cross the double track of the Cleveland, Cincinnati, Chicago and St. Louis Railway (the southern district of the New York Central).

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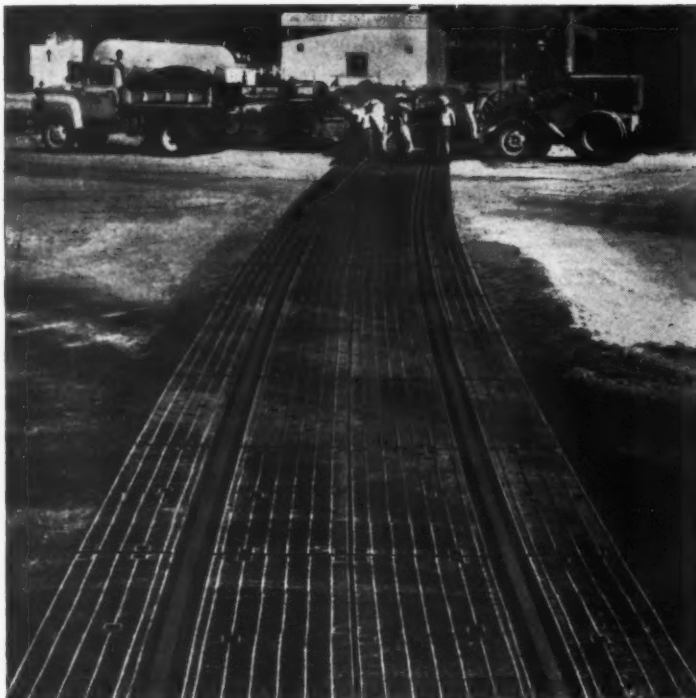
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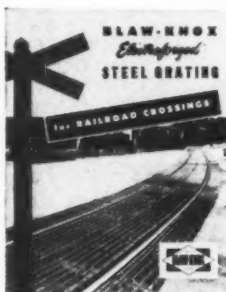
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What's the Answer (Cont'd)

is: 1st year—3-in raise and tie renewals; 2nd year—1½-in raise and no tie renewals; 5th year—1½-in raise and no tie renewals.

Prefer Three-Year Cycle

By J. R. SCOFIELD

Deputy District Engineer,
New York Central, Detroit, Mich.

We have been employing the cycle method where the track is given a 3-in raise in connection with tie renewals, and also where the track is given "no raise" when installing the ties.

When using the 3-in raise at a given location, the ties are installed on a seven-year cycle and the ties which are renewed are renewed on the basis that few, if any, ties will be installed during the following seven-year period. Any ties removed that have more than two years of life remaining are re-installed in side tracks. The length of the cycle is determined by the time that would elapse until tie renewals are again made at the same location—said period arbitrarily made on the basis that this location will not be again available for programming for seven years. Tie renewals are made solely on the basis of removing only those ties which will not effectively support tamping or maintain gage.

At locations where tie renewals are made, the ballast is cleaned ahead and track surfaced immediately behind the tie gang. On the fourth year of the cycle the ballast is again cleaned and the track is given a surface raise. On the eighth year the tie renewal with raise would again take place, the ballast being cleaned ahead and the track immediately surfaced behind.

We are also employing the so-called "no-raise" tie installation with a three-year cycle. The ties are renewed on the basis of renewing only those that have practically no further life and the track is tied up on the basis that the same location will be covered on the third year. The track is immediately spotted behind and the new ties are thoroughly tamped with airhammers. The track may or may not be surfaced the same year depending on the necessity thereof. By using this method on a three-year cycle, it is felt that a longer life can be obtained from the ties in general,

NO SPLITTING OR TURNING

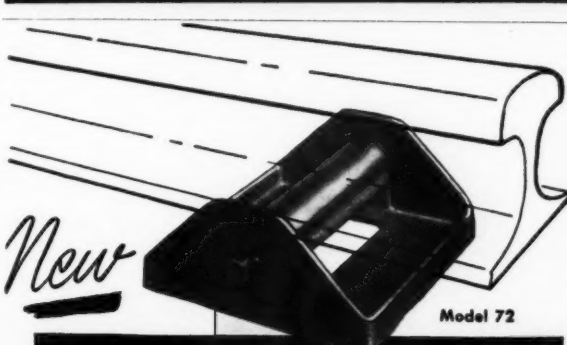
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Lewis Sealite hook bolts for bridge and trestle construction have patented fins to grip wood, without wedging, splitting or turning. Sealite washer nut stops seepage . . . retards corrosion and wood deterioration. Available in Hot-Dip Galvanized finish for greater durability and economy, in black for low original cost. Also furnished with std. sq. and hex. nuts.

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Makes Rail Bumping Faster, Easier, Safer

A REAL WORK-SAVER WHEN:

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• The Rail Dolly is a heavy-duty roller mounted on a low metal stand. Used in pairs, Rail Dollies handle the heaviest of bumping rails—make accurate bumping possible with less men. Cut damage to rail ends. Far safer than swinging rails with tongs or sliding on greased plates. Guides on each side of Dolly stand prevent rail from slipping off; cleats in base anchor Dolly firmly on top of ties or ballast. Another aid in driving rail, the Simplex Rail Puller and Expander, prevents rail from returning to its original position after bumping. Both devices described in Bulletin RR 72. WRITE:

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DRILL SIZES—2½" to 48" diameter and lengths to meet your needs.

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making for more economy in the use of material. At the same time fewer ties are installed per panel which makes for an immediate improvement in riding qualities account less disturbance of the road-

bed. Tie renewals would average about 330 per mile. Ballast cleaning is done ahead of the tie installations where necessary.

We like the "no-raise" method better since working and examining

the entire track structure at least every three years keeps the ties uniformly good with full tie life; none of the ties which are removed are later re-installed at other locations.

Underground Service Lines

In designing diesel servicing platforms, what advantages are there in placing the service lines underground? Overhead? What are the advantages of each? Explain.

Either Method Acceptable

By N. V. SCOTT

Engineer Water and Fuel Service,
Southern Pacific, Houston, Tex.

In designing diesel servicing platforms, fuel, lubricating oil and water service lines may be placed underground to protect them from possible rupture and temperature extremes. Where service platforms are paved with concrete, pipe lines may be installed in a concrete trench with a steel cover to permit easy access to the piping to make repairs.

Overhead pipe lines on steel posts have the advantage of easy maintenance, where sufficient room is available along servicing platforms. Lube oil and water lines should be insulated to protect against low temperatures and long lines should be provided with expansion joints or loops. These overhead lines are, however, subject to possible damage from cranes and lift trucks.

Meet Local Requirements

By ROBERT B. MIDKIFF

Chief Engineer,
Maintenance of Way & Structures,
Southern, Knoxville, Tenn.

Our installations have dealt generally with water, air, sand supply and sand exhaust, fuel oil, electric conduits and steam lines. Due to the convenience in making short connections and reducing the bends in the lines we have found it more advantageous to install our water, fuel oil, air and steam lines in a trench constructed into the platform. The steam line is added as a precaution against freezing during the winter months. The sand feed, sand exhaust and electric conduits are more convenient and accessible when installed overhead. These pipes are carried on brackets

mounted on iron or steel posts, which are set in concrete foundations along the center line of the platforms.

Since the overhead installation is open for inspection and is more accessible for repair, we prefer this type. Where it is necessary or more convenient to install the air, fuel oil and water lines overhead we have found they must be insulated. This increases the cost considerably.

We, therefore, try to adapt our pipeline installations to meet the local requirements.

One factor influencing the location of the different lines is placing them so as to provide a minimum of restriction to movement on the platform.

We find the overhead installation more economical except, as we have stated, where insulation is necessary.

Consider Existing Facilities

By H. O. ADKINS

General Supervisor of Water Service,
Denver & Rio Grande Western,
Denver, Colo.

In the interest of immediate as well as future economy, the existing installations would have to be considered in determining the course to be taken in new construction. Where satisfactory lines and portions of existing servicing facilities exist, it would appear necessary that we consider incorporating these items in our modernization projects.

Nevertheless, it has been our experience that larger lines, pumps and more efficient servicing devices are needed today and that very little of the old assemblies can be worked in satisfactorily.

We have learned that we can anticipate considerable and rapid deterioration of underground pipe

lines due to oil spillage accumulating in the area. However, with properly designed and maintained delivery devices plus good supervision, the spillage can be greatly reduced and pipeline life prolonged.

Properly designed and adequately concreted aprons or areas also eliminate the saturating heretofore experienced. Therefore, provided other factors do not prevent, it would appear buried lines can be salvaged or reused as is, if they are adequately sized. Burying the lines does clear the overhead, generally improves the appearance and saves the cost of repainting if exposed. The installation is simple and first cost is low.

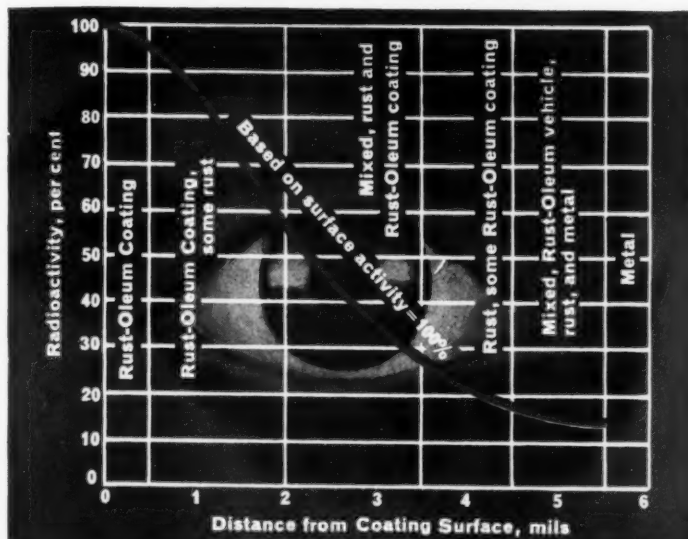
Other factors, however, may more than offset the advantages and savings suggested. For instance, many railroads are experimenting with the possibility of utilizing heavier grades of fuel oil. More often than not, the delivery rate demanded has also increased and from both angles the old lines are too small to permit moving either the heavier fuels or the larger amounts. The small lines must be replaced and steam traced or heated to produce the desired results. Therefore, it would appear that overhead lines would prove to be more satisfactory, as insulation above ground costs no more and is very likely less expensive than underground protection. Lines carried above ground and above head height for clear passage can be repaired, replaced or enlarged with greater ease and less expense. Where overhead lines are supported by columns or posts of durable material, these supports can be used as part of the servicing connections and to support lighting. They will also serve as a supporting medium for air, sand and water distribution equipment.

There appears to be no appreciable advantage in including water lines in any duct provided for fuel lines as it considerably complicates these installations since such ducts are generally utilized for air and lubricating oil lines also.

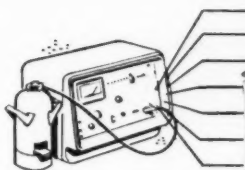
The economical method of protecting the water mains appears to

(Continued on page 58)

See Rust-Oleum *penetrate rust* to bare metal through the "Eyes" of Radioactivity!



Curved line illustrates Rust-Oleum penetration through rust at each mil level as recorded by Geiger Counter.



Rust-Oleum dries to a firm, decorative coating that resists salt water, sun, fumes, heat, humidity, and weathering.



Geiger Counter traces Rust-Oleum penetration to bare metal! In nearly three years of radioactive research, Rust-Oleum's *specialty-processed* fish oil vehicle was radio-activated and formulated into Rust-Oleum 769 Damp-Proof Red Primer — then applied to rusted test panels. Rust-Oleum's specialty-processed fish oil vehicle was then traced through the rust to bare metal by Geiger Counter.

This penetration means rust-stopping power, because the fish oil vehicle works its way into the tiny pits in the metal where it drives out air and moisture that cause rust. Important savings are yours, because Rust-Oleum can be applied directly over sound rusted surfaces — usually eliminating costly surface preparations. Attach coupon to your business letterhead for your copy of the thirty-page report entitled, "The Development of a Method To Determine The Degree of Penetration of a Rust-Oleum Fish-Oil-Based Coating Into Rust On Steel Specimens," prepared by Battelle Memorial Institute technologists.



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CHEMICALS



What's the Answer (Cont'd)

be to bury them below the frost line. They can be of cast iron or asbestos-cement and should outlast steel pipe and require no rust protection.

The cost of constructing a concrete trough or duct under the fueling platform for piping should be balanced against the cost of pro-

viding an overhead assembly as there is considerable expense in forming the concrete and mounting the covers. There is also the inconvenience of repair and/or replacement.

In addition, the fueling platform surface is not improved by the duct cover no matter how well it may be maintained.

Overhead systems can also be operated with shorter hose lengths.

The cost of installing closer servicing connections is low and can often be adopted since there are convenient supporting columns. Water and lubricating oil lines can be considered in this light also. It is essential that 100-percent coverage be maintained on fueling platforms due to the variety of tank-fill pipe spacings which vary according to the assembly of diesel units being serviced.

Tie Pads on Older Bridge Ties

Can the installation of tie pads be justified on bridge ties over 10 years old on steel bridges? Will the increased life of these ties offset the damage done by pulling and re-driving the spikes? Explain.

Highly Controversial

By L. P. DREW
Assistant Chief Engineer,
Union Pacific, Omaha, Neb.

The answer to this question is not positive, as there are many conditions which influence the decision as to whether tie pads can be justified after any life of bridge ties, whether ten years, more or less:

(1) Species and quality of timber used. For many years it was possible to secure No. 1 quality Douglas fir, southern yellow pine, or red oak, F.O.H.C., i.e., free of heart centers.

During World War II, and the years immediately following, it became extremely difficult, and in some cases impossible, to obtain high quality timbers in any species. Therefore, there are cases where it is fully justified to place tie pads on bridge ties ten years old that were of this high quality timber, whereas, ties of inferior grades would not justify pads even after a lesser period of life.

(2) Untreated bridge ties of most common species will seldom justify pads after ten years, whereas, ties treated with either creosote solutions, "penta" or salts, will justify such installation.

(3) The amount of traffic on the line in which any particular bridge is located will also influence the justification of tie pad installation, particularly when ties are of the softwood species, since plate cutting will usually have progressed during the ten years of heavy traffic to a point where the installation of pads would not be justified.

If at all possible, the installation

of pads should not be made independent of other work so that spikes will not be withdrawn and reinserted solely for this purpose. If all of the maintenance work in the area is closely watched, there will be times when rail is relaid, track is raised for ballast, or is relined and gaged—so that when spikes are pulled for any of these purposes pads could be installed without incurring any appreciable damage other than that which would normally accrue.

It is a highly controversial question as to whether the increased life of ties, resulting from the installation of pads, will offset the damage done by pulling and re-driving spikes. This is particularly true in ties over five years old.

Tie Age Unimportant

By A. A. CROSS
Manager, Tie Pad Division,
Bird & Son, Inc., East Walpole, Mass.

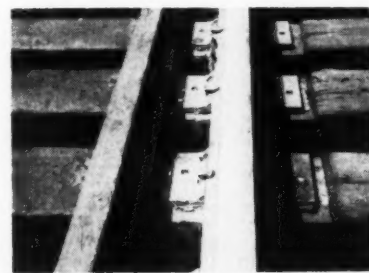
The installation of tie pads on any bridge ties can be justified regardless of the age of the ties or the type of bridge as long as the tie pads can be placed on a smooth surface of the wood, undamaged by decay or crushed fibers. If it is necessary to adze the ties to provide such a surface on sound wood, such work should be done with a mechanical adz.

The tieplate bearing area should be swabbed with a light application of creosote or other recognized preservative. This should be done for the dual purpose of killing any fungus spores on the untreated

wood surface and also to act as a cutting agent to provide the best possible seal of the pad to the tie.

The foregoing is predicated on the use of a tie pad which will assure an effective, long-lasting seal with the tie.

The pulling and re-driving of the spikes will do little or no damage to the ties, provided they are driven into field-bored holes in tie plugs or in new wood.



PADS put in on ties which were 15 years old at time of installation.

The ties shown on the bridge in the picture were 15 years old when tie pads were installed a year ago, in connection with a rail-renewal program. These pads were applied to a smooth surface on sound wood and started a new life cycle for the ties. The plate bearing areas of these bridge ties have the strength and endurance qualities of new wood—which condition will continue due to the seal protection afforded by the tie pads.

In conclusion it can be stated that the use of tie pads is justified on bridge ties over 10 years old under the following conditions: (1) That the tie pads be designed and constructed to provide an effective and durable seal with the ties; and (2) that they be applied to a smooth surface on sound wood.

It is reasonable to expect that tie pads so applied will add to the service life of the ties some 10 to 15 years, thereby effecting substantial and welcome savings.

(More on page 60)



Pictures courtesy of The New York, New Haven and Hartford Railroad Company.



SLASH YOUR BRIDGE TIE COSTS WITH **BIRD SELF-SEALING TIE PADS**

- Add 75% — 100% to the service life of new bridge ties.
- Add 50% — 75% to the remaining service life of older bridge ties where adzing is not required.
- Add many years of service life to older bridge ties where adzing is necessary.

The older bridge ties pictured above have been mechanically adzed to provide a smooth surface on sound wood. These creosoted fir ties were installed in 1940, replacing a 15-year-old creosoted fir deck. New rail was laid in 1955 at which time the bridge ties were adzed, as shown.

The installation of Bird Self-Sealing Tie Pads has

started a new life cycle for these ties. Bird Self-Sealing Tie Pads eliminate mechanical wear and plate penetration by forming a waterproof, dust-proof seal that protects all vulnerable areas under plates and around spikes.

Many more years of service in track can be confidently expected.

NEW!

BIRD TIE CAULK AND BIRD RUBBERIZED TIE COATING

Bird scientists have developed two new products to seal cracks in timbers outside the tie plate areas. When used in conjunction with Bird Self-Sealing Tie Pads, Bird Tie Caulk and Bird Rubberized Tie Coating will ensure maximum service life in track of expensive ties and timbers. For further information, write Bird Tie Pads, Dept. HTS-11, East Walpole, Mass.

Buy the BEST...



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What's the Answer (Cont'd)

Completely Justified

By R. B. CARRUTHERS
Supervisor of Structures
Southern Pacific, Houston, Tex.

I believe the answer is yes to both questions posed. When creosoted pine ties, of the average grade, on any steel bridge span are protected as nearly completely as possible against mechanical wear we can reasonably expect a maxi-

mum service life of as much as thirty years from them. Without protection from mechanical wear, ties located on steel bridges—where the density of traffic is of a normal average (something like one train per hour)—can be expected to give from 18 to 22 years of service life.

If there are no indications of decay in the ties after ten years of track service, and only the normal mechanical wear is indicated, I believe that, with light surfacing of the wear, creosoting and plugging of the old spike holes and the application of self-sealing tie pads

under large-size tie plates well secured with lock spikes, the service life expectancy of the old ties will be extended by from eight to ten years.

When the total cost of a single-span tie in place averages \$25—approximately two-thirds of which represents the cost of the tie equipped—the small amount of additional cost required to nearly double its otherwise normal service life is well justified.

Cracks in Asphalted Roofs

What causes cracks to appear on the surfaces of asphalted roofs? How can this condition be prevented? Repaired?

Three Major Causes

By J. W. MAHONEY
Master Carpenter,
Baltimore & Ohio, Baltimore, Md.

I have had a great deal to do with the problems of asphalt roofing. I have found that the life of an asphalt roof depends entirely upon the condition of the roof deck, the ventilation of the under surface of the roof deck, and the use of first-grade material properly applied.

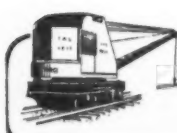
The proper ventilation of the under surface of the roof deck contributes a great deal toward the preservation of asphalt roofs. Proper ventilation will radically reduce the collection of moisture and the expansion and contraction which causes cracks, blisters and bulges to appear on the top surface of an asphalt roof. I have found that when cracks appear on the top surface of an asphalt roof, the condition is generally brought about by an over-application of asphalt liquid at the time of installation. This produces an excess of material which fails to penetrate the felt. This results in greater amounts of expansion and contraction throughout the year. It is my opinion a light layer of asphalt liquid should be applied on the top surface of the felt at the time of the roof installation which will better penetrate the interstices of the felt with the aid of varying weather conditions. This thin coat of asphalt liquid should be augmented by a finish coat of liquid which will, of course, be flexible and provide



A Burro Crane, its operator and two men on the rail will set a fast pace for the track gang to follow. Rail gangs equipped with a Burro Crane produce more work per shift at lower cost because Burros have the pace-setting speed and efficiency that helps them keep on schedule. Equally efficient with tongs, magnet, hook, bucket or dragline, Burro Cranes handle any job in stride. Fast travel speeds get them to the job in a hurry . . . heavy draw bar pull permits hauling work train and gang.

Only Burro Cranes Have:

- Fast travel speeds . . . up to 22 MPH
- Draw Bar Pull of 7500 lbs. often eliminates need for work train or locomotive
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ample protection for the roof for a period varying from five to seven years.

Roofing experience of labor is also a determining factor. Inexperienced labor employed on the application of asphalt roofs should use a cold asphalt liquid in preference to hot liquid, as improper application of the hot asphalt material may result in poor sealing. Whereas, were the cold liquid used, the felt would seal itself—again aided by weather conditions. In the repair of a defective asphalt roof where bulges and cracks have appeared upon the surface, it has been my experience that an examination of the roof should be made when the bulges have been removed, to determine the cause of the defect. Then install new material and brush a cold asphalt liquid over the entire area. If possible, the cold liquid should be applied during periods of contraction, thus giving the roof an opportunity to seal itself during periods of expansion.

Specify Good Material

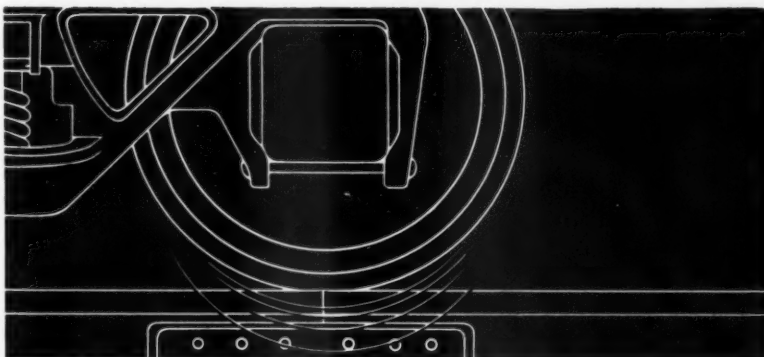
By W. H. BUNGE
Assistant Engineer,
Missouri Pacific, St. Louis, Mo.

Cracking of the asphalt surface may be caused by poor material or improper application. Roofing asphalt may be purchased on a competitive basis, pricewise, and without a proper specification. It is best to specify what is known to the trade as "bonded roofing asphalt." The asphalt should be well blended and reasonably free of objectionable foreign materials. Improper application may be due to overheating or mopping it on too heavily in layers. The correct application temperatures are usually specified by the manufacturers and overheating causes excessive evaporation of the oils. Overheated asphalt when cool becomes very brittle, having lost some of its elastic properties. Top moppings should be spread thinly and evenly. All heating kettles should be equipped with built-in high temperature thermometers and these should be observed carefully and continuously during application.

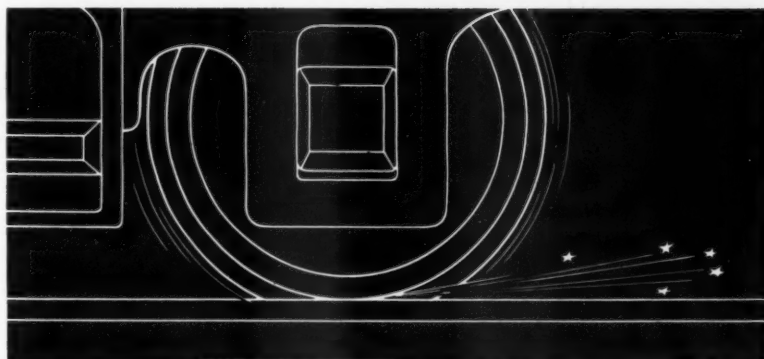
When a smooth top roof is desirable, I prefer to use asbestos felts for the finish. They only require a very thin bituminous coating applied cold and they will not crack.

(Continued on page 64)

for rail end batter



and driver wheel burns



one rod for both



Airco Railroad Rod provides a single answer to these common types of rail damage. You can use it to build up battered and chipped rail ends, or, by a simple adjustment of the welding torch's oxyacetylene flame, to fill in and smooth out wheel burns. Hardness of the deposit is 251 to 350 Brinell—well within the required range for both applications. Airco Railroad Rod is standard on many major railroads, not only because it can be used for both jobs, but also because of the high quality of its deposit.

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▲ **Note how extra-high Payscraper apron-lift** provides obstruction-free room for fast unloading. And straight-line, power-saving ejector reeving leaves more power on Payscraper wheels, to speed dumping and spreading.

▲ **Air-assisted clutch; big, safe, 4-wheel air brakes; exclusive Hydro-Steer** — all contribute to give the Payscraper its outstanding operating ease and safety. The two Payscrapers and two other towed scrapers are push-loaded by the TD-24.



▲ **Left to right:** John L. Jersey; J. M. Harris, Supt.; Dale Jersey, Supt.; and William Donaco, General Supt. of the job.





g. . plus super-fast get-away..
on industrial district job
for John L. Jersey, Inc., Portland, Oregon

John L. Jersey, Inc., Portland, Oregon, uses International "55" Payscraper loading and transport speed—and famous TD-24 follow-through push-loading—to highball the 833,000-cu-yd Rockwood Industrial District contract to timely, profitable completion.

In only 27 stop-watch-certified seconds, and only 60 to 100 feet of travel, each "55" Payscraper's bowl boils heaping full of gravelly soil—and the "55" is off to the fill at up to 20 mph!

"More dirt on the fill"—more dough in the till

Owner John L. Jersey reports: "Last year we put over 2,000 hours on both our '55' Payscrapers with cable replacements as the only necessary repairs. This year we got two more '55's' and a new TD-24 to load them fast.

I believe '55's' are the most scraper for the money.

"We've found our '55's' load in 25-30 seconds. They're simple and easy to maintain and operate. Quick, full-load Payscraper get-away means more dirt on the fill, and that's what we get paid for."

Largest of its kind in the Pacific Northwest, the triple-terraced, 188-acre Rockwood project, on the Columbia river, is a Union Pacific Railroad Co. development—to attract new industry to the Portland area.

Prove bonus-powered International equipment performance for reducing grades, removing landslides, daylighting curves, handling ties, loading ballast—for all kinds of off-track duties. See your nearby International Construction Equipment Distributor for a demonstration.

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What's the Answer (Cont'd)

Cycle Roof Maintenance

By E. B. JONES

Supervisor, Bridges & Buildings,
Chesapeake & Ohio, Clifton Forge, Va.

First, let me say that built-up roofs and roll roofs do not wear out, they dry out. The waterproofing asphalt is baked out of the felts and off the surface by the hot summer sun, leaving cracks and checks in both roll-type and built-up roofs.

This is the reason we find so many leaks at the end of a hot summer season. In most cases, a dried-out roof can be restored for many more years of permanent protection against the action of weather by re-saturating and recoating every three or four years.

Most roofing materials are made of a composition felt material and are thoroughly saturated with oils mixed with various solutions of coal tar or asphalt to make the roofing pliable. It is the evaporation of this solution from the body of the roof material that causes felt to become lifeless and crack and check.

There are several different mate-

rials on the market, produced by various companies, which are highly recommended for the restoration and resaturation of dried out roofs. These materials are made from selections of durable wear-resisting non-drying oils to which finely shredded asbestos fiber has been added. The non-drying oils serve to resaturate the heart of the felt, and the fibrous materials which are thoroughly saturated with these oils serve to form a tough, pliable coating that is impervious to water, snow, ice and weather.

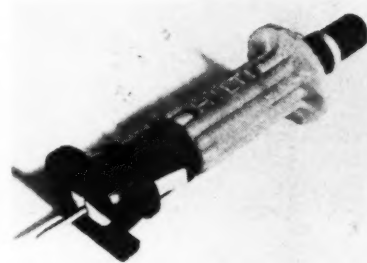
This material can be applied to composition roofing either by brush or, more economically, by spray pump. Where open cracks appear it is necessary to use a roof-tape or strips of burlap in repairing them. This is done by first applying a plastic cement to the area affected, then covering with the tape or burlap, following with another application of the plastic cement.

You can get many extra years of service out of your roll and built-up roofs by programming the application of a preservative to all roofs on a cycle of three to four years. This will prevent the roof from drying out and will, therefore, prevent cracks and checks.

PRODUCTS OF THE MANUFACTURERS

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- ▶ equipment
- ▶ materials
- ▶ devices



HAND-DRIVEN STUD FASTENER

A NEW drive tool, called the "Hilti," has been placed on the market to install pins and threaded studs in steel, concrete and other materials. The tool features what the manufacturer calls a "ballistic point" to achieve ease in penetration. The conic studs and pins, a great variety of which are available, are inserted into the jaws of the tool. Centered over the correct location, the anvil of the tool is struck with a hammer, driving the pin or stud through the material. The conical shaft design of the pins and studs is said to provide high pull-out resistance. The unit is inexpensive and, the manufacturer claims, has considerable application in railroad building and other work. *American Railroad Curvelining Corp. Dept. RTS, 137 Hollywood Ave., Douglaston, N. Y.*

CEILING CLIP, GUARD COMBINATOR

A SPECIAL guard and ceiling clip combination, designed to provide powder-actuated stud driver users with a fast inexpensive method for fastening suspended loads, grids or small structures has recently been placed on the market. The clip is inserted directly into the guard and the stud is driven through the clip into the base surface. Studs designed for steel and concrete are

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New Gravelly Self Starter . . . Choice of 3 Snow Removal Tools!

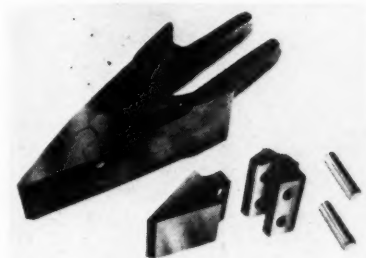
A new experience in snow removal — simply push the button and your Gravelly Tractor is ready for the toughest snow removal job! . . . The only 5-HP Tractor offering a choice of Snowblower, Snowplow or Power Brush for snow removal — choose the tool to fit your particular job.

Too, this one tractor offers 23 attachments to choose from for year 'round grounds maintenance tasks. From 75" gang mowers to 48" Snowplow, the Gravelly saves time and money all year! New Steering Sulky also available.

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GRAVELY TRACTORS, INC., Box 42, Dunbar, W. Va.

available. The clip itself is a sturdy angle bracket made of 14-gauge steel, zinc plated with a 5/16-in hole in one leg. *Remington Arms Company, Inc., Dept. RTS, Bridgeport, Conn.*



REPLACEABLE TEETH FOR EXCAVATORS

DIGGER teeth that are replaceable have recently been made available for shovel dippers, back hoe buckets, dragline, clamshell, and loader buckets. The newly designed tooth has only three parts. A universal weld-on adapter is attached, using the old tooth as a base. The second part, the replaceable tip, is held in place on the adapter by two positive lock pins. The pins are inserted and removed by merely tapping with a hammer. The adapters are made in 15 different widths to fit all popular makes of dippers and buckets. The manufacturer claims test results show that the positive lock pins maintain a tight fit, yet are easily removed for replacement of the teeth. *Allied Steel & Tractor Products, Inc., Dept. RTS, 7835 Broadway, Cleveland 5, Ohio.*

FOUR-CYLINDER AIR-COOLED ENGINE

A NEW MODEL air-cooled engine is currently available—designated as Model VH4. The 30-hp, 4-cylinder, V-type engine is of "high torque" design and operates at a maximum speed of 2800 rpm. The engine can be adapted to operate on kerosene, natural gas, LP fuels or fuel oil of 38-42 deg Baume gravity and 35 octane rating. Special equipment available for the engine includes hydraulic pump, visual-type air-precleaner, rotating screen, automatic high temperature switch and electric generator and starter (or starter only). *Wisconsin Motor Corporation, Dept. RTS, 606 W. Wisconsin Ave., Milwaukee 3, Wis.*

RAILWAY TRACK and STRUCTURES

The THORO System of Masonry Protection

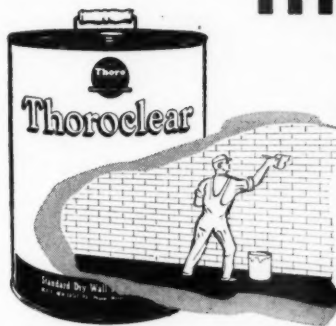
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No change in color or texture of brick, limestone, sandstone, tile or stucco surfaces. Applied by brush or spray.

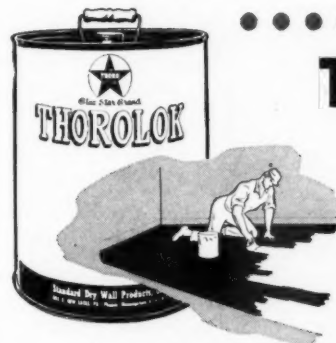
Keep water out of your masonry walls and protect interior plaster, paints and expensive furnishings.



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THE MONTH'S NEWS...

... among railway men—the associations—the suppliers

Changes in Railway Personnel

Engineering

L. E. Bates, assistant to the chief engineer of the Atlantic Coast Line, has been promoted to assistant chief engineer with headquarters, as before, at Wilmington, N. C.

William L. Mogle has been named engineer of appropriations on the Southern Pacific at San Francisco, succeeding **William T. Black**, who has retired after more than 34 years of service.

P. P. Wagner, Jr., has been appointed division engineer on the Wichita division of the Missouri Pacific at Wichita, Kans., succeeding **J. H. Greason** who has been transferred to the Illinois division and Missouri-Illinois Railroad east of the Mississippi river, with headquarters at St. Louis, Mo. **R. J. Bruce**, assistant engineer at St. Louis, has been promoted to division engineer of the St. Louis Terminal division at St. Louis. The position of assistant division engineer of the St. Louis Terminal division has been abolished.

John D. Walker, whose promotion to division engineer on the Canadian National at Capreol, Ont., was recently announced (RT&S, Aug., p. 56), was born March 28, 1928, at Stratford, Ont. He received his bachelor's degree from the University of Toronto in 1950 and his master's degree from the Massachusetts Institute of Technology in 1952. He joined the Canadian National on May 1, 1950, as a junior assistant engineer on the Toledo terminal division. In 1953 he was named assistant engineer in the office of the district engineer at Toronto and in 1954 was transferred to the division offices at St. Thomas, Ont., and London—the latter position held at the time of his recent promotion.

O. G. Linde, whose promotion to assistant division engineer on the Northwestern Pacific at San Rafael, Cal., was recently announced (RT&S, Aug. p. 52), was born on October 3, 1925, at Hede, Sweden. He graduated from the Technical Institute in Stockholm, Sweden in 1948 and prior to coming to the U. S. A. in 1949 was construction engineer for the Swedish government. He entered railway service in January 1950 with the Southern Pacific as a rodman, serving successively as instrumentman, junior engineer, engineer inspector and cost analyst until June 1953 when he was named assistant engineer on the Portland division. In August 1954 he was

transferred to the Northwestern Pacific where he served as acting roadmaster—the position he held at the time of his recent promotion.

H. W. Kellogg, whose promotion to assistant chief engineer of the Chesapeake & Ohio at Richmond, Va., was recently announced (RT&S, October, p. 66), was born November 21, 1905, at Atlanta Ga.



H. W. Kellogg

Upon graduation from the University of Michigan in 1928, he joined the Pere Marquette as a rodman. He subsequently served as levelman, instrumentman, assistant supervisor of track and track supervisor until March 1944 when he was promoted to division engineer at Saginaw, Mich. In February 1946 he was transferred to Detroit, transferring again in March 1950 to Grand Rapids. In June 1953 he was named engineer of track at Detroit, the position he held at the time of his recent promotion.

Hal E. Wilson, whose promotion to chief engineer, Eastern Lines, of the Atchison, Topeka & Santa Fe at Topeka, Kan., was recently announced (RT&S, Sept., p. 100), was born January 12, 1904, at Rockwall, Tex. He attended the University of Texas and, on June 5, 1922, joined the Santa Fe as a chainman. He served successively as rodman and transitman on maintenance, location and construction until December 16, 1934, when he was promoted to assistant engineer at Amarillo, Tex. On March 16, 1937, he was named general foreman, bridges and buildings and water service at Las Vegas, N. M. Three years later he was promoted to roadmaster at that location. On July 22, 1940, he was named division engineer at Las Vegas. From March 15, 1942, until September 15,

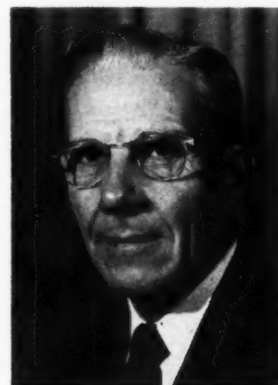
1945, Mr. Wilson served with the U. S. Army, rising to the rank of lieutenant-colonel. (He is presently director of engineering, Military Railway Service, USAR.) On October 16, 1946, he was named district engineer at Los Angeles and, on November 1, 1949, was trans-



H. E. Wilson

ferred to Topeka, Kan.—the position he held at the time of his promotion to chief engineer. Mr. Wilson was on leave of absence from the Santa Fe in 1950-1951 while he prepared an engineering, economic and financial report for a proposed 400-mile railroad in Peru.

John A. Bunjer, district engineer of the Eastern district of the Union Pacific at Omaha, Neb., has been promoted to chief engineer, succeeding **William C. Perkins**, who has retired after 40 years of service. **Paul G. Martin**, division engineer at Kan-



John A. Bunjer

sas City, Mo., succeeds Mr. Bunjer as district engineer at Omaha. **Warren R. Tyler**, resident engineer at Omaha, has been promoted to division engineer at Kansas City, succeeding Mr. Martin.

(More on page 68)



RACINE

Hydra-Quad (Patent Pending) **TAMPER**

**Just one man operates
this four-tool ballast tamper**

Here's a completely hydraulic machine that tamps more track per man per day . . . and does it more uniformly. One operator controls the vertical movement and lateral position of four tampers through two finger-tip hydraulic valves. *Each tamping gun acts independently to insure full compactness of ballast at all points.* All four tamping guns automatically tilt to carry ballast under the tie at proper depth. To accommodate crooked ties, the operator simply swivels the main head.

The Hydra-Quad tamper is easy to adjust for varying rail heights and wider-than-average ties. Each

gun is equipped with a quick-change tamping bar holder.

Drop-down and outboard wheels insure easy removal from track. Hydraulic cylinder raises and pivots the machine. Power winch assists in rerailling. Movement from tie to tie is powered by a fluid motor that also operates the power winch.

One more flexibility feature: Off-center outrigger mounting permits two men to operate machines on opposite rails to tamp both tie ends simultaneously. Send for free folder and specifications. Address **RACINE HYDRAULICS & MACHINERY, INC.**, 2038 Albert St., Racine, Wisconsin.

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- With capacities of 7,500, 18,000 and 30,000 ft. lbs. per blow.



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Railway Personnel (Cont'd)

Mr. Bunjer was born at Sibley, Iowa, January 7, 1902, and received his Bachelor's degree in Civil Engineering from Iowa State College in 1925. He served as an instrumentman on the Union Pacific from 1923 until 1928 when he was named assistant engineer. From 1930 until 1940, Mr. Bunjer worked as a designer for the Missouri State Highway Department. He returned to the Union Pacific as a draftsman in 1940 and served successively as inspector and assistant engineer. He was serving in the latter capacity at Salt Lake City, Utah, in 1945 when he was promoted to division engineer. He was subsequently promoted to assistant chief engineer at Omaha and district engineer of the Eastern district—the position he held at the time of his promotion to chief engineer.

Mr. Perkins was born in Soldier, Ida., December 20, 1888. He received his Bachelor's degree in Civil Engineering from the University of Idaho in 1914 and entered railroad service with the Oregon Short Line (UP) as a draftsman in 1916. He served in World War I with the 23rd U. S. Engineers, and on July 22, 1919, returned to the Union Pacific as an instrumentman, remaining in this capacity until August 1920 when he was named engineering accountant. From March 1, 1921, until June 14, 1927, he served as instrumentman and assistant engineer. On the latter date he was

promoted to assistant roadmaster and on November 1, 1927, was named roadmaster. On January 16, 1929, he was promoted to division engineer. After

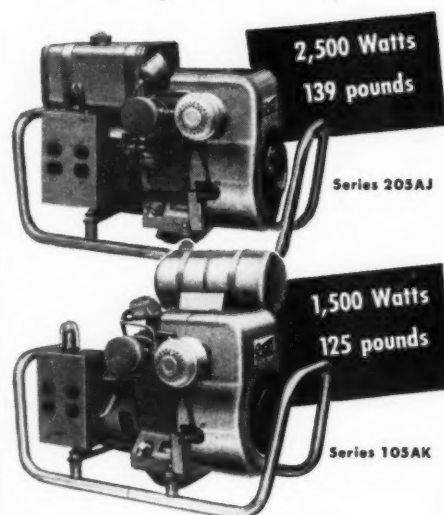


William C. Perkins

again serving as roadmaster and division engineer, he was appointed general roadmaster in 1933. He served as division engineer from August 10, 1934, until January 1, 1937, when he was promoted to district engineer of the road's Western district. From July 1, 1942, to February 1, 1946, Mr. Perkins was system maintenance engineer at Omaha. On the latter date he was promoted to assistant chief engineer. He was named chief engineer on January 1, 1947.

(More on page 70)

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These power-packed electric plants give you all the 4-cycle advantages of quick starting, long life and trouble-free operation... with an amazing weight saving over usual 4-cycle plants. You can carry them easily to any spot... and you can count on them delivering their full rated capacity as long as you need it. Both are single-cylinder, air-cooled... completely equipped and ready to go. Other models to 50,000 watts.

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WOOD PRESERVING PLANTS: St. Louis, Mo.—Granville, Wis.—Shreveport, La.—Columbus, Miss.

Railway Personnel (Cont'd)

Track

William J. Siffin, roadmaster on the Cloverleaf district of the Nickel Plate at Frankfort, Ind., has retired after 41 years of service.

J. G. Sauder, roadmaster on the Canadian National at Palmerston, Ont., has been transferred to St. Thomas, succeeding **H. E. Clare**, who has retired.

R. N. Schmidt and **L. F. Woodlock** have been appointed roadmasters on the St. Louis-San Francisco with headquarters at Tennessee Yard and Ft. Scott, Kan., respectively. **G. P. Chandler** has been named assistant roadmaster with headquarters at Oklahoma City, Okla.

J. C. Waldrop has been promoted to track supervisor on special assignment on the Central of Georgia. **H. J. Lester** and **K. L. James** have also been promoted to track supervisors with headquarters at Fort Valley, Ga., and Union Springs, Ala., respectively.

S. O. Smith, rodman on the Chesapeake & Ohio at Grand Rapids, Mich., has been promoted to assistant supervisor of track at that location. **A. C. Trimble** has been named assistant supervisor of track at Walbridge, Ohio, and **J. W. Martin** has been appointed supervisor of track with headquarters at Marion, Ohio.

William W. Toliver, whose promotion to roadmaster on the Atchison, Topeka & Santa Fe at Wellington, Kan., was recently announced (*RT&S*, Sept., p. 104), was born April 14, 1923, at Yesso, N. M. He attended New Mexico A&M College and on May 5, 1952, joined the engineering department of the Santa Fe as a chainman at Clovis, N. M. He served successively as rodman, draftsman, transitman and assistant engineer on various construction projects prior to his recent promotion.

Bridge & Building

H. M. Wilson, assistant supervisor of structures on the Pennsylvania at Columbus, Ohio, has been promoted to supervisor of structures on the Northwestern region with headquarters at Chicago.

G. F. Lithgow, architect of the Central region of the Canadian National at Toronto, has been promoted to assistant chief architect with system jurisdiction and with headquarters at Montreal. Mr. Lithgow succeeds **H. C. Greensides** who has been promoted to chief architect, system, at Montreal, succeeding **G. F. Drummond**, who has retired.

Special

J. C. Hamlin has been appointed timber treating engineer on the New York Central with headquarters at Rome, N. Y., succeeding **W. E. Doty**, deceased.

E. H. Fisher, superintendent of mechanical maintenance for the Canadian

National's road transport department, has been named to the newly created position of manager of work equipment, with headquarters at Montreal.

C. S. Dennis, assistant fuel service engineer on the Chesapeake & Ohio at Huntington, W. Va., has been promoted to fuel service engineer with headquarters at Richmond, Va.

Obituary

J. R. Clarkson, roadmaster on the Canadian National at Mirror, Alta., died recently.

Charles O. Wolfersberger, track supervisor on the Baltimore & Ohio at Aberdeen, Md., died recently. Mr. Wolfersberger had served the B&O for 43 years.

Association News

American Railway Engineering Association

This is the slack season for committee meetings. Only one committee (Rail) has scheduled a meeting for November. This committee will meet at Chicago, on the eighth.

There is activity in other directions, however. The Conventions Arrangements committee was scheduled to hold a meeting at St. Louis on November 1, the purpose being to reorganize the committee for handling the March 1957 convention at St. Louis. Also, the Nominating committee met at St. Louis on November 2. As usual, this meeting was held immediately preceding the regular fall meeting of the Board of Direction. The purpose of the meeting of the Nominating committee was to set up a slate of officers to be elected at the annual meeting of the association on March 4-6, 1957.

All committees of the association now have a new assignment, "Subject Assignments for Study and Research." The new assignment gives official status to the present unofficial subcommittees within practically all committees on "new subjects" or "outline of work." The hope is that the new assignments will further intensify the ferreting out of problems for committee attention and solution.

Mississippi Valley Maintenance of Way Club

The November meeting of the club will be held on the 12th at the Coronado Hotel, St. Louis, and will feature an address by **L. C. Blanchard**, roadmaster, Milwaukee Road, on "The Technique of Track Surfacing or Maintenance of Surface and Line."

At this meeting each of the four past presidents of the club will be presented with a certificate of appreciation. They

are: **V. C. Hanna** (1952-53), chief engineer, Terminal Railroad Association of St. Louis; **A. B. Chaney** (1953-54), engineer maintenance of way, Missouri Pacific; **W. J. Hedley** (1954-55), assistant chief engineer, Wabash; and **E. L. Anderson** (1955-56), chief engineer, Frisco.

P. E. Odom, former secretary-treasurer of the club, will be presented with a resolution indicating appreciation of the membership for his services to the organization.

Northwest Maintenance of Way Club

The November meeting of the club will be held on 29th at the usual place of meeting—the Midway Civic Club in St. Paul. The principal feature of the program will be an address by **W. B. Blix**, manager of the Railway Equipment department, Nordberg Manufacturing Company. Mr. Blix will discuss future developments in maintenance of way work equipment.

(More on page 72)

Meetings and Conventions

American Railway Bridge and Building Association—**Elise LaChance**, Secretary, 431 S. Dearborn street, Chicago 5.

American Railway Engineering Association—Annual Meeting, March 4-6, 1957, Hotel Sheraton Jefferson, St. Louis, Mo. **Neal D. Howard**, Secretary, 59 E. Van Buren street, Chicago 5.

American Wood-Preservers' Association—Annual Meeting, April 29-May 1, 1957, Conrad Hilton Hotel, Chicago. **W. A. Penrose**, Secretary-treasurer, 839 Seventeenth street, N. W., Washington 6, D. C.

Bridge and Building Supply Association—**L. R. Gurley**, Secretary, 201 North Wells street, Chicago 6.

Maintenance of Way Club of Chicago—Next meeting, November 26. **S. F. Kosco**, Secretary-treasurer, 135 E. 11th Place, Chicago 5.

Metropolitan Maintenance of Way Club—**G. Rogers**, Secretary-treasurer, 30 Church street, New York.

Mississippi Valley Maintenance of Way Club—Next meeting, November 12, 1956, Coronado Hotel, St. Louis, Mo. **R. B. Davis**, Secretary-treasurer, Room 1025, Frisco Building, 906 Olive street, St. Louis 1, Mo.

National Railway Appliances Association—**J. B. Templeton**, Secretary, 1020 So. Central avenue, Chicago 44; **Lewis Thomas**, Assistant Secretary, 59 East Van Buren street, Chicago 5.

Railway Tie Association—**Roy M. Edmonds**, Secretary-treasurer, 1221 Locust street, St. Louis 3, Mo.

Roadmasters' and Maintenance of Way Association of America—**Elise LaChance**, Secretary, 431 S. Dearborn street, Chicago 5.

Track Supply Association—**Lewis Thomas**, Secretary, 59 E. Van Buren street, Chicago 5.

All Leading
Railroads are
Buying . . .

WESTERN FORMERLY BUDA JACKS TO MAINTAIN TRACKS



Increasingly heavy traffic over mainlines that must be kept in fast condition places critical emphasis on improved track maintenance technique. This is where WESTERN TRACK JACKS are building a deserved reputation for *safe, fast, positive* action . . . the real reason for their booming popularity by all leading railroads.

Take the versatile, sturdy, dependable Model 715 shown

here. Like all WESTERN TRACK JACKS, its capacity is 15 tons. Its lifting range goes up to 13 inches, either from the wide cap or ample toe lift. Both pawls are held in close contact with the strong rack bar by super-heavy safety springs. "Tripping" is unusually fast and simple but, as a safety feature, requires definite, positive action to avoid accidental lowering of load.

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WESTERN's wide variety of Hydraulic Jacks (9- to 100-ton capacity), Ball Bearing Journal Jacks (15- to 50-ton capacity), All Purpose Screw Jacks (10- to 24-ton capacity), and Klinch Klaw Jack are rapidly gaining wider acceptance in the erection and maintenance of structures.

HYDRAULIC JACK Model 25B22

Most complete line in "Hi-Speed" and "Two-Speed" models. Widest range in closed heights (8 to 28 inches) and lift ranges (4 to 22 inches).



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Faster lifting ratio. Wider lift ranges (4 to 8 inches). Wider cap and base. Larger ram. No creeping or accidental lowering.



ALL PURPOSE SCREW JACK

Extra heavy-duty bell bottom base. One-piece steel machine screw with forged steel head. Complete series of 23 models to choose from.



KLINCH KLAU Model 225A

Aluminum Alloy Housing

Pulls all types of headed or headless bolts, spikes, rods. Pulls bolts between ties from 20 inches below the surface.



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Where lifting height requirements are lower, the popular Model 514 has a range up to 5 inches. Top end of track bar is notched for track lining application.



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MODEL 514 A
ALUMINUM FRAME TRACK JACK

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For detailed information on most complete jack line available anywhere.

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Maintenance-of-Way Division

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IN CANADA: Melville Machinery Co., Ltd., Montreal 3, Que. • T. S. Taylor Machinery Co., Ltd., Winnipeg 12, Man. • Simson-Maxwell, Ltd., Vancouver 5, B. C.

One of a series of ads featuring new WESTERN products formerly supplied by BUDA

6710

Duff-Norton No. 117—America's most popular jack for track maintenance—available with malleable or aluminum (33 $\frac{1}{4}$ % lighter) housings.



**A larger, stronger
rack bar
makes this the
safest track jack...**

A ratchet jack is no stronger or safer than its rack bar, the notched steel "heart" that moves up and down holding the load.

The forged steel rack bar on Duff-Norton track jacks is stronger and therefore safer than the rack bar on any other make. It's *safer* because it's *larger*! The larger, heavier rack bar gives lower stress which means greater safety and dependability.

Next time you see a Duff-Norton track jack, examine the rack bar. Look at the rack bar on any other make ratchet jack of the same rated capacity which, you will see, is considerably smaller.

So get the best, the safest, and longest lasting jacks for your money—precision-made, sturdy, high quality, dependable Duff-Norton jacks.

For complete information on the No. 117 and other Duff-Norton jacks made exclusively for railroad men write for bulletin AD18-F, Duff-Norton Co., P. O. Box 1889, Pittsburgh 30, Pa.

DUFF-NORTON
*"Giving The Railroads
A Lift Since 1883"*
Jacks

DUFF-NORTON COMPANY

Supply Trade News

General

The W-M Corporation has announced the moving of its general offices from Chicago to 294 East 147th street, Harvey, Ill.

The Huber-Warco Company, Marion, Ohio, has announced the appointment of the W. W. Williams Company, Columbus, as distributor of Huber-Warco road machinery throughout the state of Ohio.

The Bucyrus-Erie Company, Milwaukee, Wis., has announced that Giles & Ransome, Inc., Philadelphia, Pa., will offer sales and parts service on Bucyrus-Erie cranes and excavators in eastern Pennsylvania, southern New Jersey, and the state of Delaware.

Homelite, a division of Textron, Inc., Port Chester, N. Y., has announced plans to build a new 135,000-sq ft factory building at Gastonia, N. C., for the production of gasoline-powered chain saws. Construction of the new plant will begin this month; full operation is expected by the fall of 1957.

It has been announced that the railroad track maintenance machines developed by the Railway Maintenance Corporation, Pittsburgh, Pa., will be manufactured in England under a licensing agreement with Beyer Peacock & Co. Ltd. In some cases Beyer Peacock will redesign the machines for service on narrow-gage track. The British firm will produce the machines for sale throughout the world with the exception of the United States, Canada, Germany and Mexico.

Personal

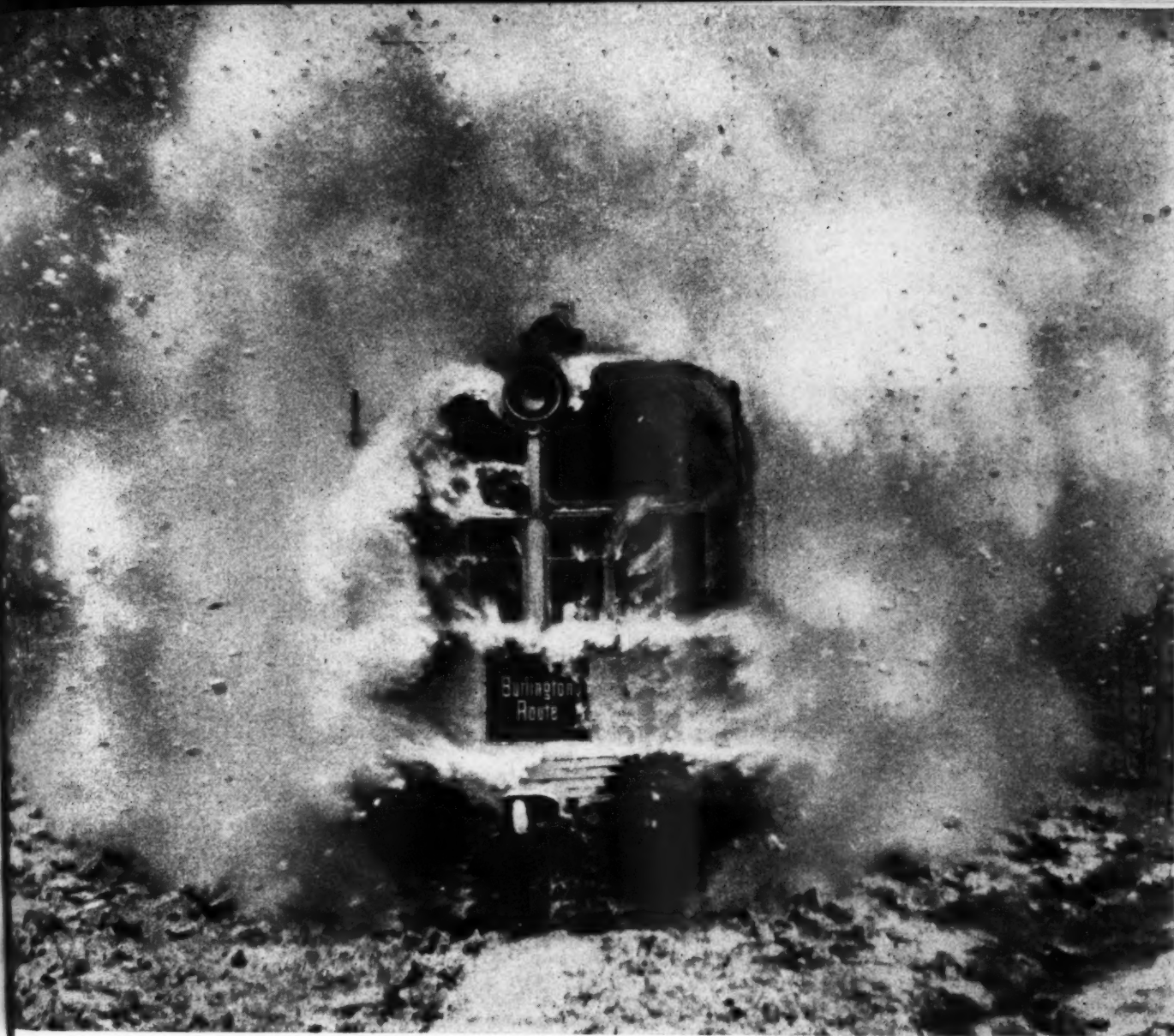
Gerald J. Weihofen, western mechanical editor of *Railway Age* and western editor of *Railway Locomotives & Cars*, has joined Kaiser Aluminum & Chemical



Gerald J. Weihofen

Sales, Inc., as railway industry specialist. Mr. Weihofen, who will make his headquarters at Kaiser Aluminum's general

(Continued on page 74)



How to smash the RR sales barrier

The go-ahead signals are flashing on American railroads . . . with new equipment, faster trains, more automatic controls . . . with piggy-back freighting, rising traffic, a \$3.6 billion-a-year spending program. But how do you get your sales story across to the men who run the railroads . . . your product accepted by executives who make and influence buying decisions?

How else indeed but RAILWAY AGE . . . the one business magazine that brackets every sector of railroad management . . . the field's *only* newsweekly which interprets the swift-moving trends and developments so imperative to top-strata executives. From board chairman

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Talk *business* to railroad *management* in... **RAILWAY AGE**

SIMMONS-BOARDMAN • 30 CHURCH ST., NEW YORK 7, N. Y. (ABC-ABP)

Workbook of the Railways

RAILWAY TRACK and STRUCTURES

NOVEMBER, 1956 73

Supply Trade News (Cont'd)

sales offices in Chicago, is a graduate of Purdue University. After serving with the Erie, he joined the Simmons-Boardman Publishing Corporation in 1946.

John S. Hutchins, director and vice-president of the **American Brake Shoe Company** and president of the firm's National Bearing and Ramapo Ajax divisions, has been elected executive vice-



John S. Hutchins

president of the parent firm. **Charles M. Ruprecht**, executive vice-president of the National Bearing division at St. Louis, succeeds Mr. Hutchins as president of

that division. Mr. Hutchins will continue as president of Ramapo Ajax.

Joe W. Kizzia, western editor of *Railway Age* at Chicago, has been promoted to executive editor succeeding **William H. Schmidt, Jr.**, who has resigned to become director of public relations for the Baltimore & Ohio.

Mr. Kizzia joined the Simmons-Boardman Publishing Corporation in 1949 on the staff of the firm's Washington bureau. He was named western editor in June of this year. A graduate in journalism from



Joe W. Kizzia

Northwestern University, Mr. Kizzia is the former editor of a weekly newspaper in Arkansas. He received his practical railway training with a railway operating

battalion in Europe during World War II.

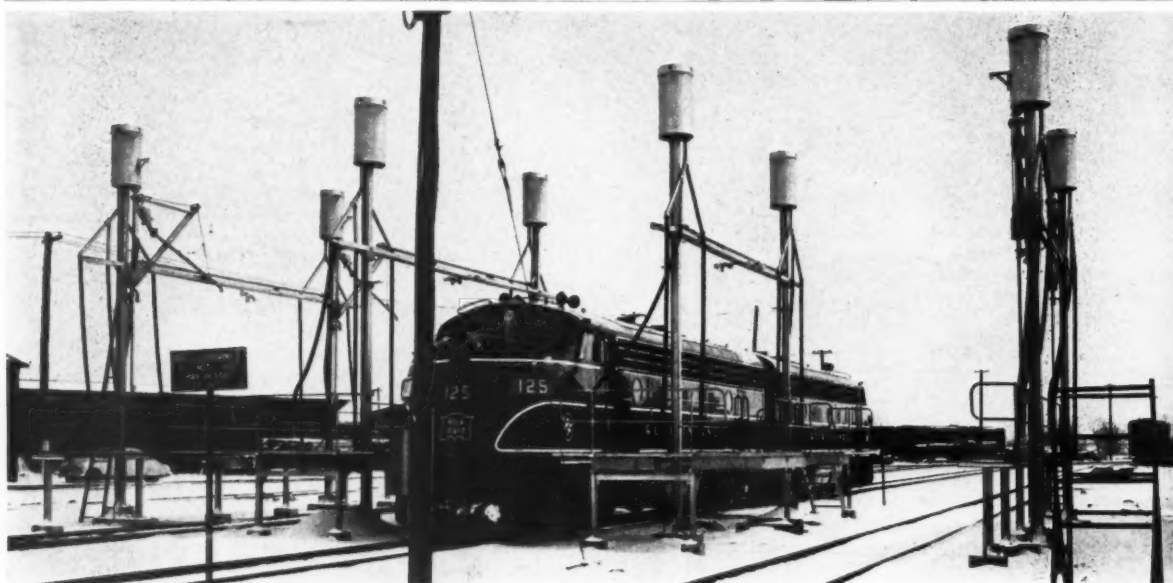
Mr. Schmidt joined Simmons-Boardman in 1937 as an associate editor on the *Railway Age* staff. After serving as a



William H. Schmidt, Jr.

major in the Quartermaster and Transportation Corps during World War II, he rejoined *Railway Age* as transportation editor in 1946. In 1950 he was promoted to western editor. Two years later he was named executive editor at New York.

Alfred P. Emery has been named railroad sales manager for the **John N. Thorp Company**, Brooklyn, N. Y. Mr. Emery will supervise the sale of Rust-Oleum protective coatings and Molub-Alloy to the railroad industry through Thorp offices in Brooklyn, Boston, Mass.,



Eliminate costly overhead storage ... use

SNOWCO

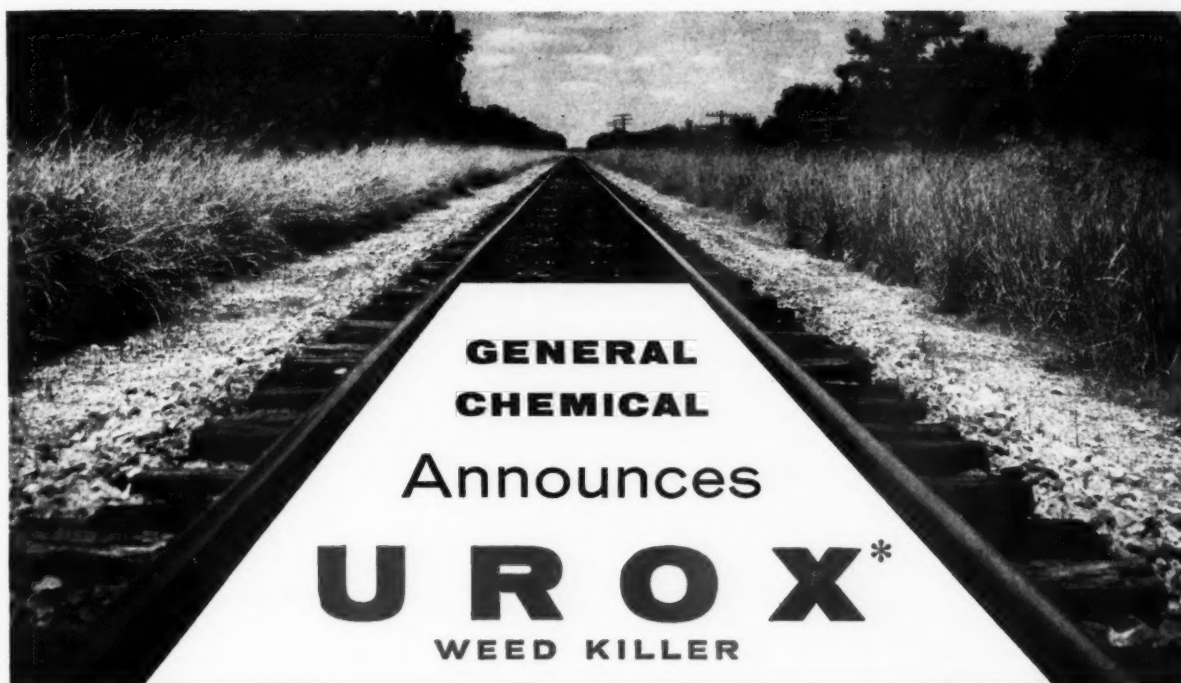
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Chicago Office: 9 South Clinton Street, Chicago 6, Illinois



An amazingly effective new chemical herbicide, **UROX** makes possible lower-cost weed control for rights-of-way, switchyards, trestles!

You can save time and money by controlling weeds with UROX Weed Killer because . . .

1. Only one application a year is needed under normal growing conditions! Field tested on a wide range of annual and perennial grasses and broad leafed weeds, UROX has given outstanding control for as long as *10 months!* Under average conditions, just one application will wipe out unwanted vegetation for a full season!

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3. Light "booster" doses keep most areas weed-free from season to season! The herbicidal effects of UROX are cumulative. Much smaller quantities will do the job on the second and following seasons.

And you get these other important advantages . . .

1. UROX is easy to use! Comes in free-flowing granular form. No expensive spreaders to buy. No water needed. No dilution necessary.

2. UROX is safer! UROX does not add to flammability of vegetation. UROX has low toxicity for humans and animals.

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☐ Please have representative call.

Name

Title

Company

Address

City Zone State

RT-11

Supply Trade News (Cont'd)

Camden, N. J., New Haven, Conn., Norfolk, Va., and Baltimore, Md.

R. G. Wade, a member of the board of directors of Fairmont Railway Motors, Inc., since May 1949, and treasurer since October 1, 1955, has been elected vice-chairman of the board, president, and general manager, and will have general supervision over the affairs of the company. **W. F. Kasper** has retired as president and general manager, but will continue as chairman of the board of directors and will serve as advisor on sales and products.

C. H. Johnson, who has been with the

company since 1926, serving as assistant to the president since 1939, has been elected vice-president and assistant general manager and a member of the board of directors. He will assist in the general supervision of the affairs of the company.

Kenneth Cavins, who has been with Fairmont since 1926 and in charge of district sales since 1945, has been appointed vice-president with responsibility for all sales activities throughout the United States. **W. D. Brooks**, who has been with the company since 1915, and in charge of export sales since 1925, has been appointed vice-president. In that capacity he will have responsibility for sales activities in the foreign field, excepting Canada.

Ira Sublett, who has been with the

company since 1937, has been appointed chief engineer.

W. J. Klein, vice-president and general sales manager for the Tractor Group of the **Allis-Chalmers Manufacturing Company** at Milwaukee, Wis., has been appointed vice-president and director of sales for the Group. **W. L. Voegeli**, assistant director of engineering, has been promoted to general sales manager, succeeding Mr. Klein.

Mr. Klein joined Allis-Chalmers in 1928 as a salesman at the firm's Sioux Falls branch. The following year he was named a special factory representative



W. J. Klein

working in North and South Dakota and Minnesota. In 1930 he opened and was named manager of the company's branch at Minneapolis, Minn. He was named general sales manager of the Tractor Division in 1953 and shortly thereafter was appointed to a vice-presidency.

Mr. Voegeli joined Allis-Chalmers as a serviceman with the firm's Wichita (Kan.) branch in 1935 and later the same year was transferred to Omaha, Neb. He became a member of the company's home office service department staff in 1936 and in 1939 was promoted to assistant agricultural service manager. In 1946 he was named supervisor of the technical publications department and in



W. L. Voegeli

January 1948 was promoted to agricultural tractor sales manager. He held the latter position until November 1952 when he was promoted to assistant director of engineering—the position he held at the time of his recent promotion.

TIE PLATE LOCK SPIKES ... GAGE LOCK SPIKES

Hold Gage—Extend Tie Life

Reduce Maintenance



Tie Plate
Lock Spike



Gage Lock Spikes in Track

TIE PLATE LOCK SPIKES hold tie plates firmly in place on cross-ties and bridge timbers. They are quickly and easily driven or removed with standard track tools. Driven to refusal, the spread shank is compressed by the walls of the hole. Plates are held against movement under spring pressure. Play between spike and hole is eliminated—gage is held and plate cutting is overcome.

The **GAGE LOCK SPIKE** is a rail spike, as well as a plate fastening, for use on tangent track and light curves where lateral thrust can be overcome with only two spikes at each plate rather than four cut spikes. It possesses the same features and advantages as the Tie Plate Lock Spike. The Gage spike is offset at the tie plate surface to avoid thrust and wear from the edge of the rail base. The use of Gage spikes saves up to 13,000 spikes per mile and potential damage to the tie from spiking and splitting is drastically reduced.



Gage Lock
Spike

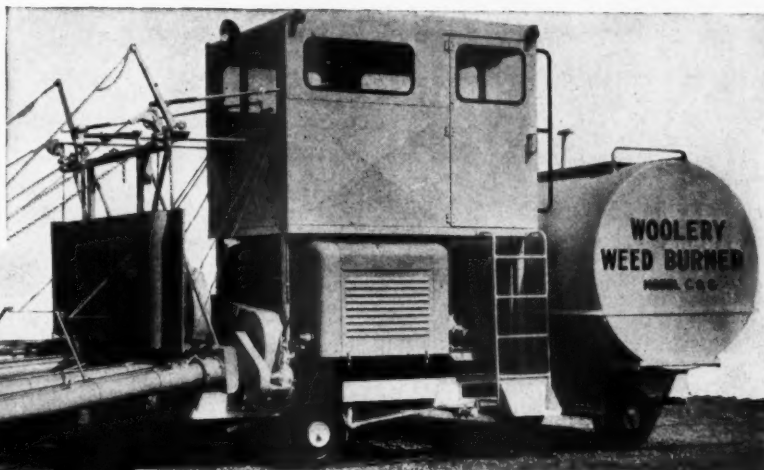
BERNUTH, LEMBCKE CO., INC.
420 Lexington Avenue, New York 17, N. Y.

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ROAD BEDS, EMBANKMENTS
AND DITCHES — QUICKLY
CLEARS SNOW FROM YARDS
AND SWITCHES**

Woolery put its first weed burner in service on a major road in 1925. Today's advanced design, the model C.O.E., embodies every refinement made in more than 30 years of continuous improvement.

All Woolery design changes are for increased efficiency with no loss of simplicity . . . no sacrifice of the famous Woolery easy maintenance features.

THE FAMOUS **WOOLERY** HEAVY-DUTY WEED-BURNER is an excellent SNOW-MELTER



- TORQUE CONVERTER drive on propelling engine.
 - ALL STEEL CAB. Doors fasten half-open to deflect heat and scoop in air.
 - ELECTRIC IGNITION to all five fireless alloy steel burner heads. Burners can be used individually or all five together. Outer burners can be manipulated from cab while machine is in operation.
 - TWO BRAKING SYSTEMS. Power for service, manual for parking or emergency.
 - CHOICE OF ENGINE MAKES . . . Also available in 3-burner, 2-burner or 1-burner models.
- Literature and specifications on request.
- Also manufacturers of Woolery Tie Cutters, Tie End Removers, Bolt Tighteners, Spike Drivers, Track Tool Transporters, Motor Cars and Joint Oilers.

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GASOLINE AND LPG ENGINES

Model	Cyl.	Bore	Stroke	Displ.	Horse Engine H.P.
N56	4	2 1/4	3 1/2	56	14.4 @ 2200 RPM
N62	4	2 1/2	3 1/2	62	15.3 @ 2200 RPM
Y69	4	2 1/2	3 1/2	69	21.4 @ 2400 RPM
Y91	4	2 1/2	3 1/2	91	28.5 @ 2400 RPM
Y112	4	3 1/8	3 1/2	112	32.0 @ 2400 RPM
F124	4	3	4 1/8	124	36.5 @ 2400 RPM
F140	4	3 1/8	4 1/8	140	42.0 @ 2400 RPM
F162	4	3 1/8	4 1/8	162	49.0 @ 2400 RPM
F186	6	3	4 1/8	186	60.5 @ 2400 RPM
F209	6	3 1/8	4 1/8	209	68.0 @ 2400 RPM
F226	6	3 1/8	4 1/8	226	73.0 @ 2400 RPM
F244	6	3 1/8	4 1/8	244	79.0 @ 2400 RPM
M271	6	3 1/8	4 1/8	271	86.2 @ 2400 RPM
M290	6	3 1/8	4 1/8	290	92.2 @ 2400 RPM
M330	6	4	4 1/8	330	104.4 @ 2400 RPM
M363	6	4	4 1/8	363	128.9 @ 2800 RPM
B371	6	4 1/8	4 1/8	371	110.0 @ 2400 RPM
B427	6	4 1/8	4 1/8	427	127.0 @ 2400 RPM
G134	4	3 1/8	4 1/8	134	34.2 @ 2000 RPM
G157	4	3 1/8	4 1/8	157	40.0 @ 2000 RPM
E201	4	3 1/8	4 1/8	201	65.4 @ 2400 RPM
H227	4	3 1/8	5 1/2	227	54.0 @ 1800 RPM
H243	4	3 1/8	5 1/2	243	57.9 @ 1800 RPM
H260	4	3 1/8	5 1/2	260	62.0 @ 1800 RPM
H277	4	4	5 1/2	277	66.4 @ 1800 RPM
K363	6	4	4 1/8	363	123.0 @ 2400 RPM
J382	4	4 1/8	6	382	74.0 @ 1400 RPM
T371	6	4 1/8	4 1/8	371	119.0 @ 2400 RPM
T427	6	4 1/8	4 1/8	427	140.0 @ 2400 RPM
U501	6	4 1/2	5 1/8	501	159.0 @ 2400 RPM
R513	6	4 1/2	5 1/8	513	164.3 @ 2400 RPM
R572	6	4 1/2	5 1/8	572	182.4 @ 2400 RPM
R602	6	4 1/2	5 1/8	602	191.7 @ 2400 RPM
V603	8	4 1/8	4 1/8	603	220.0 @ 2800 RPM
S749	6	5 1/8	5 1/2	749	217.0 @ 2200 RPM
S820	6	5 1/8	5 1/2	820	237.0 @ 2200 RPM

CUSHIONED POWER DIESEL ENGINES

Model	Cyl.	Bore	Stroke	Displ.	Horse Engine H.P.
JD129	4	3 1/8	3 1/8	129	34.0 @ 2000 RPM
GD157	4	3 1/8	4 1/8	157	39.0 @ 2000 RPM
*ED201	4	3 1/8	4 1/8	201	45.8 @ 2000 RPM
HD243	4	3 1/8	5 1/2	243	55.0 @ 2000 RPM
*HD260	4	3 1/8	5 1/2	260	59.0 @ 2000 RPM
*HD277	4	4	5 1/2	277	63.2 @ 2200 RPM
*JD382	4	4 1/8	6	382	72.5 @ 1600 RPM
TD427	6	4 1/8	4 1/8	427	106.0 @ 2000 RPM
RD572	6	4 1/8	5 1/8	572	154.0 @ 2000 RPM
VD603	8	4 1/8	4 1/8	603	175.0 @ 2600 RPM
SD802	6	5 1/8	5 1/2	802	202.0 @ 1800 RPM

*Available for industrial applications only.



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6718 CEDAR SPRINGS ROAD, DALLAS 5 TEXAS • 1252 OAKLEIGH DRIVE, EAST POINT (ATLANTA) GA.

Helps From Manufacturers

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information, write direct to the manufacturer.

CRAWLER TRACTORS. A new 12-page illustrated booklet called "Big Tracks" illustrates the engineering, manufacturing and design features of the manufacturer's largest crawler tractors. Methods whereby users can obtain greater versatility and economy of operation of their tractors through the use of attachments are described. The booklet, designated Form DE627, is available also in French, Spanish and Portuguese. (Write: Caterpillar Tractor Company, Dept. RTS, Peoria, Ill.)

CORROSION PROTECTION. Techniques for protecting underground pipe from corrosion with "Scotchrap" insulation tape is the subject of a new, 24-page booklet. Called "Tape It Easy," the booklet contains step-by-step photographs and instructions for wrapping bends, elbows and short sections, patching pipe with tape, preparing joint surfaces for wrapping, wrapping welded joints and taping straight pipe sections as well as street "T" fixtures and other typical fittings. A table on the book's back cover lists recommended tape widths for various pipe sizes. (Write: Minnesota Mining & Manufacturing Co., Dept. D6-262-RTS, 900 Fauquier St., St. Paul, Minn.)

SKID SHOVELS. Six new pieces of literature have recently been made available describing Drott "Skid-Shovels" and attachments. A 16-page, two-color catalog covers the entire Drott line, with on-the-job photos showing units utilizing various attachments, and diagrams illustrating the latest improvements. Other literature includes an eight-page catalog describing the several sizes of log and pulpwood "Skid-Grapples" available, a four-page bulletin on grubber blades, and single-page specification sheets on the following: bullangoedzer blades, rock forks, and scarifiers. Order numbers for the literature described are, in order of mention, K656, A-100, A-200, A-400, A-500, and A-300. (Write: International Harvester Company, Dept. RTS, 180 N. Michigan Ave., Chicago 1.)

PIPE PUSHING. A recently issued manual, tells how pipe of practically all sizes can be installed by the "power-pushing" method. The methods described and illustrated in the 16-page booklet can be used, the manufacturer claims, with any type of pipe pusher, whether hand or power operated. The methods described should be of value to anyone concerned with the underground installation of pipe and/or conduit. Write: Mercury Hydraulics, Inc., Dept. RTS, 2440 Blake Street, Denver 5, Colo.)

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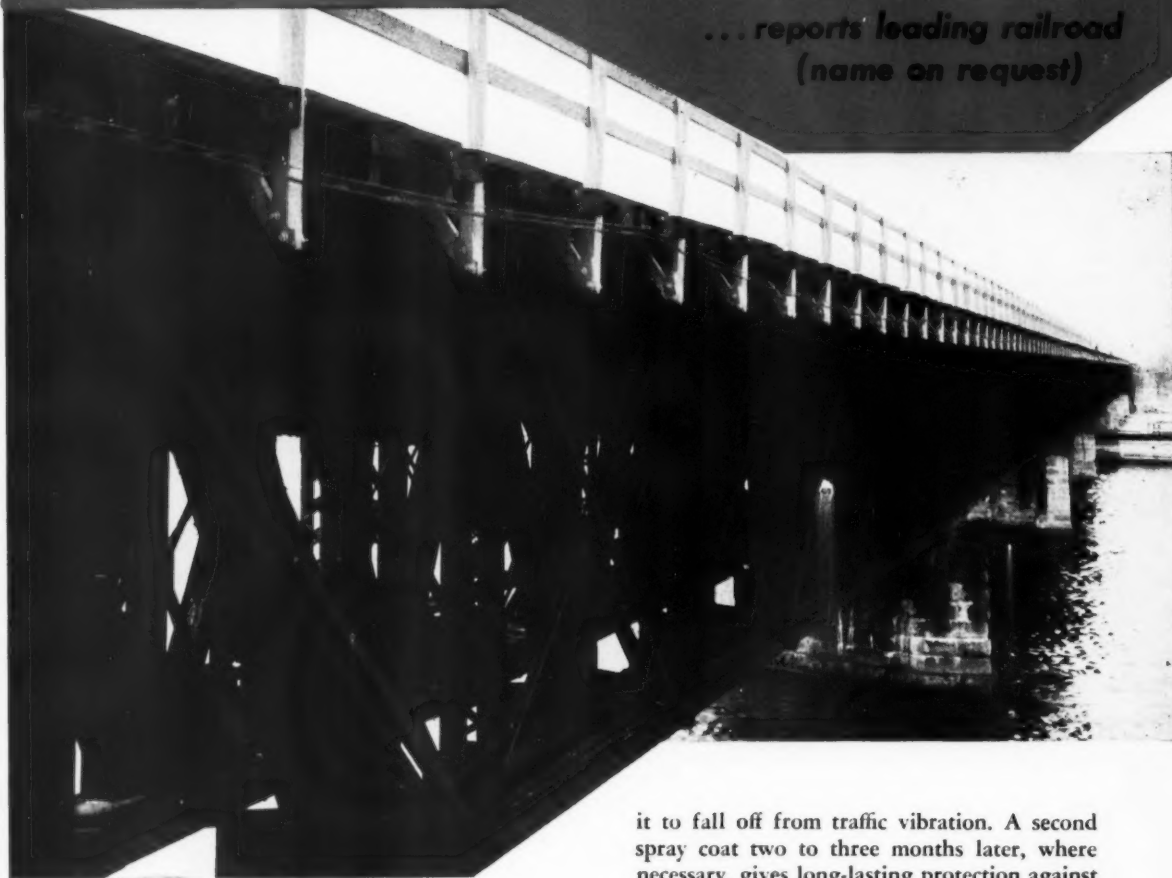
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